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## AGRONOMY

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(See also in this issue Entries 2234, 2305, 2328, 2456, 2492, 2499, 2632, 2847, 2900, 2959, 2960, 2962, 3041, 3057, 3065, 3100, 3103, 3124, 3139, 3140, 3156, 3161, 3163, 3172, 3174, 3180, 3184, 3194, 3196, 3231, 3258)

2066. ANONYMOUS. Agricultural possibilities, in Ceylon: *Fibres. Tropic. Agric.* 56: 1-2. 1921.—Sisal, *Agave sisalana*, has been shown to be well adapted for cultivation in the dry zone of northern Ceylon. A syndicate has undertaken the cultivation of sisal and *Furcraea* in that region.—*Lyster H. Dewey*.

2067. ANONYMOUS. Cane experiments on the South Coast. Results obtained at Winkle Spruit. *South African Sugar Jour.* 6: 27. 1922. [Rev. of some of the results published in Vol. 3 of the "Cedara Memoirs" of the Cedara School of Agriculture.]—The Uba variety of cane is most suited for general cultivation in the coastal region of Natal. It is deep rooting, drought resistant, and does not suffer much from fungus diseases. A new variety, Agual, has lately proved successful for general work. The greatest returns come from planting the cane in 5 foot rows, sets 3 feet apart in the row. The cane should be trashed, not burned. After a period of growth, determined by soil conditions, the cane should be plowed out and replanted. This cane can best be used for seed purposes when 12 months old. The tops give the most vigorous growth. The Agricultural Department's station at Winkle Spruit near Durban was closed November, 1921, the station having served the purposes for which it was established in 1902, i.e., "to investigate the problems of coastal agriculture in Natal."—*J. Rumbold*.

2068. ANONYMOUS. Departmental varieties tried at Currabubula. *Agric. Gaz. New South Wales* 33: 92. 1922.—The results with wheat, oats, and barley varieties "afford undeniable evidence that the varieties grown by the majority of farmers in the district are inferior fielders compared with those recommended by the department."—*L. R. Waldron*.

2069. ANONYMOUS. Field experiments, 1921. *Jour. Dept. Agric. Ireland* 21: 437-451. 1921.—This paper discusses results of variety tests with barley, potatoes, mangels, oats, turnips, and wheat; manurial tests with potatoes, turnips, and wheat; and a cultivation test with potatoes.—*Donald Folsom*.

2070. ANONYMOUS. Keeping growing potatoes cool. *Sci. Amer.* 125-A (Dec.): 127. 1921.—It is said that the potato plant flourishes best at a soil temperature of 70°F. A temperature of 90°F. is about the upper limit of safety. Deep and constant cultivation is probably the best procedure when abnormal heat begins to bake the soil.—*Chas. H. Otis.*

2071. ANONYMOUS. La harina de Yuca. [Yuca flour.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 622-624. 1921.—Brazil produces annually 500,000 tons of this flour, which is in daily use in South America. The Yuca plant, *Manihot manihot*, grows extensively in Cuba. Investigations were conducted in the hope of reviving the production and use of this flour. Methods and costs of preparing the flour and returns from growing the crop are briefly discussed and recipes given.—*G. R. Hoerner.*

2072. ANONYMOUS. Report of the work of the seed propagation division for 1921. *Jour. Dept. Agric. Ireland* 21: 452-476. 1921.—Wheat, oats, barley, flax, and grass are considered in regard to pure line cultures, hybridization, large scale and small scale variety tests, and time of sowing (of barley). Formalin treatments prevented barley smut (*Ustilago Hordei*). Change of habitat for 1 year influenced the next year's yield of a pure line of flax.—*Donald Folsom.*

2073. ANONYMOUS. Sugar cane in Uganda. *South African Sugar Jour.* 6: 21. 1922.—This is a review of a report by J. D. SNOWDEN of the Department of Agriculture, Kampala, of experiments at the Government plantation in the district of Uganda. The Government plantation imported seed cane in 1916 from Mauritius, India, and Kenya. The cane matures in 15-18 months after planting, but is hard to harvest as it ripens irregularly. December-January is the best defined ripening period. The cane is free from disease. The 6 best varieties for sucrose content are No. 3 Red, Sealy's Seedling, Ceylon cane, Striped Tanna, B. 3922, and Uba. The Uba, a swamp variety, came from India.—*C. Rumbold.*

2074. ANONYMOUS. The R. A. S. field wheat competition. *Agric. Gaz. New South Wales* 33: 1-6. 1922.—This article discusses principles of wheat growing on the northwestern slopes and plains of New South Wales and tabulates the details of the awards.—*L. R. Waldron.*

2075. ANONYMOUS. The sugar cane industry in East Africa. *South African Sugar Jour.* 6: 29. 1922.—In Portuguese East Africa the soil is fairly good, the land flat, and mechanical work easy. The wet season usually lasts from December until April, the rainfall varying from 30 to 45 inches, being heaviest near the coast. After the land is cleared it is double-plowed 13-24 inches deep. Shallow drains are constructed 40-50 feet apart by a surface plow. The cane rows are 6 feet apart. Uba is the most successful variety grown. The plants are weeded and cleaned until about 6 months old, then left alone as the trash and leaves adhere so closely it is practically impossible to clean them. When 18-20 months old they are burned and cut, the yield being about 60 tons per acre. After this the only work is weeding and moulding for another 6 months. The Uba ratoons well to the 3rd or 4th ratoon. The ratoons are cut after about 12 months and yield 13-30 tons per acre. Insect pests are not troublesome so far, due perhaps to the hard rind of the Uba cane.—*C. Rumbold.*

2076. ANONYMOUS. Three field wheat competitions. The western districts. *Agric. Gaz. New South Wales* 33: 21-25. 1922.—Principles of wheat growing for the western district are discussed and details of the awards among the successful competitors are tabulated. Fallow preceding wheat is strongly recommended.—*L. R. Waldron.*

2077. ALDABA, VICENTE C. The cultivation of Abacá and preparation of its fiber in Davao. *Philippine Agric.* 10: 273-282. 1922.—Eight varieties, designated by local names, are cultivated in Davao. The principal varieties are Maguindanao and Boñgolanon, the latter rapidly gaining in favor because its fiber is easily cleaned. It is resistant to drought and grows well on a wide range of soils, but is short-lived, declining rapidly after about 6 years.

The plantations are mostly in deep alluvial soils along the Davao Gulf coast, where the rainfall of 2300 mm., falling mostly at night, is well distributed. Cultivation and preparation of the fiber are described. The fiber from the outer 6-8 leaf-stalks constitutes the "streaky" grades. From the next 10-12 the fiber is very white and constitutes the C, D, and E Government grades. From the remaining 3-5 sheaths the fiber is soft and white, constituting grades A and B. Harvesting, beginning 2-3 years after planting, is repeated every 3-4 months.—*Lyster H. Dewey.*

2078. ALTER, J. CECIL. **Alfalfa seed growing and the weather.** Utah Agric. Exp. Sta. Bull. 171. 31 p., 9 fig. 1920.—The yield of alfalfa seed is largely dependent upon climatic conditions. The best seed yields seem to require an abnormally warm spring with abundant rainfall to produce a vigorous, early hay crop, followed by a summer a little cooler than usual, without too much precipitation, to give a slow and gradual growth of the seed plants. Too much moisture in summer causes the plant to produce herbage rather than flowers and seed. Rainfall or irrigation must be timely to insure the proper filling of the seeds. Blossom time appears to be most critical. Excessive warmth and drought cause the blossoms to wilt and blight, and rainfall or cloudy weather interfere with fertilization by reducing insect activity and by making it more difficult to trip the trigger mechanism of the alfalfa blossom. The mean monthly temperatures found most advantageous to seed production are: March, 40°F.; April, 48; May, 56; June, 65; July, 70; and August, 75°F.—*B. L. Richards.*

2079. ARNIM, VON. **Zu den Leipziger Verhandlungen über Futtersilofragen.** [The Leipzig discussions of silo questions.] Mitteil. Deutsch. Landw. Ges. 37: 129-132. 1922.—This summarizes the facts brought out at this meeting.—*A. J. Pieters.*

2080. BARTLETT, H. **More wheat per acre.** Agric. Gaz. New South Wales 33: 77-78. 1922.—The principles of wheat production, especially methods of cultivation and preventives of diseases and weeds are discussed.—*L. R. Waldron.*

2081. BLAKELEY, W. F. **Newly recorded weeds.** Agric. Gaz. New South Wales 33: 6. 1922.—*Chenopodium Vulvaria*, *Sisymbrium Sophia*, and *Centaurea picris* are recorded as new introductions to the Province.—*L. R. Waldron.*

2082. BOERNER, E. G. **Factors influencing the carrying qualities of American export corn.** U. S. Dept. Agric. Bull. 764. 99 p., 72 fig. 1919.—Observations on cargoes of export corn showed that corn which was dry and sound when shipped arrived in Europe in like condition. The higher the percentage of moisture in the corn when shipped, the greater the danger of spoilage. Contributing factors such as season, position on vessel, and length of voyage also affected the carrying quality.—

2083. BOSMAN, A. J. **The chief causes of low yields of maize in the Union.** Jour. Dept. Agric. Union South Africa 3: 507-514. 1921.—The average yield of maize for the year 1917-18, according to the Agricultural Census returns, was 2.2 bags or approximately 8-9 bushels per acre,—a yield decidedly below that of other countries. The year was unfavorable, owing to severe drought. Some of the main contributory factors are irregular or insufficient rainfall, poor soils, poor seed, improper preparation of the soil, failure to practise crop rotation, and shortage of labor.—*E. M. Doidge.*

2084. BROILI, JOS. **Zur Beschreibung der Kartoffel.** [Description of potatoes.] Fühling's Landw. Zeitg. 70: 222-232. 1921.—The author outlines a system for identifying potato varieties by describing in detail the various characters of typical plants. Letters of the alphabet are used to designate each peculiarity of the whole plant, stem, leaf, blossom, tuber, and disease condition.—*A. T. Wiancko.*

2085. BROWN, E. B., AND H. S. GARRISON. **Effect of date of seeding on germination, growth, and development of corn.** U. S. Dept. Agric. Bull. 1014. 10 p. 1922.—The corn

germinated more rapidly the later the seeding occurred. Northern grown varieties are capable of starting growth at lower temperatures than the later maturing varieties of central and southern states. The total growth of stalks was greatest from seedlings in May and June. The rate of growth was most rapid from June and July seedlings. Growth was least and rate of growth lowest from April seedlings, and growth was more rapid in the later than in the earlier seedlings. The number of ears per stalk, size of ear, and amount of suckering bore no consistent relation to the date of seeding. The pollen-shedding period was longer in plants from earlier seedlings than from later seedlings. Seedlings earlier than normal resulted in slight gains in the date of silking.—*L. W. Osborn.*

2086. BRYCE, N. J. **Cultivation of the castor oil plant.** *Agric. Gaz. New South Wales* 33: 26. 1922.—The castor oil plant was tested at Grafton and Wollongbar. With seed selling at £14 per ton, which it brought at Melbourne, it was found that the crop was not profitable.—*L. R. Waldron.*

2087. BURTT-DAVY, JOSEPH. **Maize as a raw material for manufacture. 1.** *South African Jour. Indust.* 5: 26-33. 1922.—The author enumerates the products and by-products of the maize plant and gives figures and statistics showing the enormous amount of maize consumed in this industry annually in the U. S. A. The physical composition of the maize grain is fully described.—*S. M. Stent.*

2088. BURTT-DAVY, JOSEPH. **Maize as a raw material for manufacture. 2.** *South African Jour. Indust.* 5: 80-85. 1922.—This article discusses the chemical composition of maize grains and gives the results of a number of analyses.—*S. M. Stent.*

2089. BURTT-DAVY, JOSEPH. **Starch and glucose from maize.** *South African Jour. Indust.* 5: 130-136. 1922.—This article deals chiefly with the production of corn oil, gluten, and other products of the maize grain.—*S. M. Stent.*

2090. CALVINO, MARIO. **Ensayos de distancias en la siembra de la caña.** [Experiments on distances in the planting of sugar cane.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 596-601. 1921.—The results of 2 years' experiments are not considered final because in Cuba cane plantings remain for at least 6 years and further cuttings might modify the conclusions. Extensive tables present detailed information under the following headings: experiments on the most convenient distances in planting the cane; total production in sugar cane; total production of sap and commercial production of sugar. The probable error method is used in determining results.—*G. R. Hoerner.*

2091. CALVINO, MARIO. **Ensayos de "seedlings" Cubano en competencia con la caña Cristalina.** [Experiments with Cuban "seedlings" in competition with the sugar cane Cristalina.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 582-585. 1921.—At the 2nd cutting 53 Cuban "seedling" canes were compared with varieties of Demerara canes and the standard Cuban variety Cristalina. Extensive tables present data on yields of cane, sap, and sugar, and chemical analyses of the cane at the time of cutting. Many of the Cuban seedlings appear superior to Cristalina.—*G. R. Hoerner.*

2092. CALVINO, MARIO. **La selección de la caña y el cañaveral de planta-madre seleccionada.** [The selection of sugar cane and the plantation of selected mother plants.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 612. 1 pl. 1921.

2093. CALVINO, MARIO. **Mis ensayos sobre enmiendas y abonos, llevados a cabo en 1914 en México.** [My experiments on correction and fertilizers carried through in 1914 in Mexico.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 576-581. 1921.—Applications of lime to Eekendorfer beets gave a net return of \$110 per hectare. Potassium chloride, superphosphate, ammonium sulphate, and crude powdered gypsum on Alexandrian clover gave, after 4 cuttings,

a net return of \$78 per hectare. Potassium sulphate and Thomas slag on 1-year old common violet Italian clover gave a net return of \$58 per hectare, after 6 cuttings. Bone meal (not ungelatinated), potassium sulphate, and calcium carbonate, on 1 plot of beans, variety "Bayo Gordo," and bone meal (ungelatinated), potassium sulphate, calcium carbonate, and ammonium sulphate on another plot showed net losses of \$4.20 and \$8.40 per hectare respectively. The fertilized plots matured more quickly than the check, but the high cost of fertilizer and low prices for beans resulted in the loss. Wheat following the beans would, it is thought, reflect in its yield the residual effect of the fertilizer and turn the loss to profit. Superphosphate, potassium chloride, crude powdered gypsum, and ammonium sulphate on sweet Italian onions gave a net return of \$79 and \$262 respectively for each of 2 plots. The 1st plot was treated like the 2nd minus the ammonium sulphate, which apparently was the important factor. Bone meal, ammonium sulphate, and potassium sulphate on turnips (white rutabaga) gave a net return of \$160 per hectare. Potassium chloride, superphosphate, ammonium sulphate, and gypsum on sweet white Italian onions gave a net return of \$118 per hectare.—The chemicals were applied in dry sections in the irrigation water. Sulphur flour was applied to 2 plots of onions at the rate of 50 and 100 kgm. per hectare respectively, giving a net return of \$281 and \$792 per hectare.—*G. R. Hoerner.*

2094. CALVINO, MARIO. *Tratamientos especiales de los trozos de caña que se siembran.* [Special treatment of sugar cane cuttings for planting.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 605-611. 8 pl. 1921.—Experiments were conducted to compare the effects of hot water, camphor water, and cold water on the rooting of cane cuttings. Hot water caused a germination of 70 per cent of total buds, camphor water 51 per cent, and cold water 20 per cent. Varying the temperature and time of the hot water treatment showed that 60°C. for 10 minutes gave best results, 95.5 per cent of the buds having germinated within 17 days. It was also found that seed pieces with a single central bud gave better results than those with many buds. Of the former, 80 per cent germinated as compared with 50 per cent of the latter.—*G. R. Hoerner.*

2095. CALVINO, MARIO. *Una leguminosa arbórea de rápido crecimiento, para producir abono verde, madera dura y leña para quemar.* [A tree legume of rapid growth for the production of green manure, durable timber, and fire wood.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 613-615. 2 pl. 1921.—Observations on the use of Mezquite (*Prosopis juliflora* (Sw.) DC.) in Mexico for green manure led to a study of *Cassia siamea*, planted in Cuba from seed sent from the Philippines; 121,200 kgm. of material suitable for green manure and 77,280 kgm. of green wood is produced per hectare. Chemical analysis shows the leaves and stems to contain higher percentages of nitrogen than cowpeas, velvet bean, *Canavalia ensiformis*, *Crotalaria juncea*, or *Caján indicus*. It is not relished as food by animals. It makes good fuel, canes, implement handles, and is a good cabinet wood. Being a bright-flowered evergreen, it is ornamental, and useful as a shade tree and for wind breaks.—*C. R. Hoerner.*

2096. CAMUS, J. S. *Rice in the Philippines.* *Philippine Agric. Rev.* 14: 7-86. Pl. 1-47. 1921.—This is a general treatise on rice-growing as practiced in the Philippines. Over 1200 named varieties were tested, and these reduced to about 990 more or less distinct forms.—*E. D. Merrill.*

2097. CHAUDHURY, NIBARAN CHANDRA. *Jute in Bengal.* *Rev. ed., 288 p., 6 fg.* W. Newman & Co., Ltd.: Calcutta, 1921.—Objections to jute cultivation on the ground that it crowds out necessary food crops are not well founded. Nearly 3,000,000 acres were devoted to jute in India in 1919. The differences between *Corechorus capsularis* and *C. olitorius* are given. There are no accepted common names designating these 2 species. Many races are recognized, but pure races are rarely grown commercially. Soils, climate, cultivation of the crop, and preparation of the fiber are described. The production of the fiber requires much hand work.—*Lyster H. Dewey.*

2098. CHEVALIER, A. [Rev. of: JUMELLE, H. *Les huiles végétales, origines, procédés de préparation, caractères et emplois.* (Vegetable oils, origin, preparation, nature, and uses.) *Encyclopedia Industrielle* 493 p., 125 fig. J. B. Ballière, Paris, 1921 (see Bot. Absta. 11, Entry 2128).] *Rev. Bot. Appl.* 1: 233-235. 1921.

2099. CLARK, CHARLES H. *Experiments with flax on breaking.* U. S. Dept. Agric. Bull. 833. 29 p., 3 fig. 1920.—Three years' experiments on breaking of flax at Mandan, North Dakota, are reported. The rainfall was favorable, especially in 1914 and 1915, and high average yields of flax were produced. In a test of 14 varieties in field plats the "European seed" types, varieties which are commonly grown in the flax area, produced the highest yields. The yield of linseed oil by ether extraction ranged from 33.8 to 37.8 per cent for the different varieties, and the computed yield of oil per acre ranged from 214 to 355 pounds. The growing period, from date of emergence to maturity, averaged 85 days in 1914, 102 in 1915, and 90 in 1916. The ratio of straw to seed ranged from 1.8:1 to 2.9:1 and averaged 2.4:1. The size of seeds produced by the different varieties was compared by the weight of 1000 seeds, which ranged from 4.010 to 4.845 gm. In rate-of-seeding experiments the author found "little advantage in seeding at a heavier rate than 20 pounds (per acre) under semiarid conditions." In date-of-seeding experiments results "indicate an advantage for early seeding." A test in nursery rows of 49 varieties from foreign and commercial sources made it possible to classify the varieties in rather natural groups. The varietal groups suggested are: textile fiber, short fiber, European seed, Argentine, Turkish, Golden, Chinese Turkestan, Abyssinian, Indian, and Egyptian.—A. C. Dillman.

2100. COE, H. S. *Sweet clover seed. Part I. Pollination studies of seed production. Part II. Structure and chemical nature of seed coat.* U. S. Dept. Agric. Bull. 844. 59 p., 8 fig. 1920.—Part I. Aside from mechanical difficulties in harvesting, the chief causes of the prevalent low yields of sweet clover seed are abortion of the seed pods and possibly lack of pollination. The authors report critical studies of the development of the floral organs and the seed, illustrating these with diagrammatic drawings. In tests with pollen of *Melilotus alba* satisfactory germination was obtained both in pure water and in sugar solutions, indicating that atmospheric humidity is not in itself a factor in poor fertilization. Contrary to the opinions of Darwin and others, *M. alba* was found to be self-fertile, although spontaneous self-pollination occurs rarely. The honey bee was by far the most important pollinating agent although more than 60 other insects were noted visiting the flowers. Apparently small insects are as efficient pollinators as large, and the day-flying are much more important than the night-flying species. The insects pollinated from 11 to 31 per cent more flowers on the upper and exposed racemes than on the lower ones. Bursting of the anthers was stimulated by saturating the soil with water at blossoming time, and seed production was increased 26 per cent.—Part II. A review of the literature is followed by an account of chemical tests in which the impermeable parts of the seed coat were found to be the homogeneous "light line" of the Malpighian layer. The light line was impermeable to stains, and its chemical nature was not determined as it reacted to none of the tests. Exposure of the seed for 1 hour to concentrated sulphuric acid did not destroy the light line but did open slight canals through it, thus admitting moisture to the embryo. A bibliography of 44 titles is appended.—L. W. Kephart.

2101. COLEBATCH, W. J. *Lachlan oats.* Agric. Gaz. New South Wales 33: 67. 1922.—This promising variety of Australian origin is derived from Algerian crossed with Vilmorin's White Ligowo. The grain resembles Algerian but is lighter in color.—L. R. Waldron.

2102. COOK, O. F. *Improvements in cotton production.* U. S. Dept. Agric. Dept. Circ. 200. 12 p. 1921.—The appearance of the boll-weevil has stimulated study in cotton improvement in recent years. Desirable cultural characters are set forth, and improved community organizations and commercial system are discussed.—L. R. Hesler.

2103. CORBOULD, M. K. **Wheat, flour and bread.** Ohio Agric. Exp. Sta. Bull. 350. 187-219, illus. 1921.—Various varieties of wheat grown by the Department of Agronomy at the Ohio Agricultural Experiment Station and certain other varieties grown on the County Experiment Farms in Ohio have been treated individually. Their various characteristics have been carefully studied and are tabulated. Of the "soft red winter" wheat grown in Ohio 2 groups have been designated as "semi-hard" and "soft," the former including those of best quality for all baking purposes. The soft white wheat produces much bran, the semi-hard varieties give a high percentage of flour. Among these are Gladden, Portage, Trumbull, Ohio 9922, Goens, Nigger, Fulcaster, Ohio 8106, and Deitz. The milling qualities of a number of these varieties and the baking value of the various flours are worked out extensively. Each variety is described as to amount of starch and gluten obtained and as to places best adapted for its growth, and Wisconsin and Ohio spring wheats and their milling records are compared.—The following 12 tested varieties are recommended for their quality: Gladden, Portage, Trumbull, Poole, Goens, Nigger, Fultz, Fultz-all-Mediterranean, Valley, Rudy, Mediterranean, and Hickman. The intrinsic qualities of the winter wheats tested are very concisely and comprehensively given.—*R. C. Thomas.*

2104. CZUBER, E. **Zu der Abhandlung E. Alfred Mitscherlich: Feldversuche mit Kartoffeln.** [Concerning E. Alfred Mitscherlich's treatise: Field investigations with potatoes.] *Landw. Jahrb.* 55: 491-505. 1921.—This criticism is directed mainly to the mathematical treatment of the subject.—*A. J. Pieters.*

2105. DACY, G. H. **Revolutionizing an industry.** *Sci. Amer.* 124: 446, 457-458. 4 fig. 1921.—The author discusses ways in which modern machinery is minimizing hand labor in hemp production.—*Chas. H. Otis.*

2106. DAHL, A. L., AND R. GORTHOLO. **The story of sugar.** *Sci. Amer.* 125-A (Dec.): 128-130. 4 fig. 1921.—This popular article discusses the source of the world's raw material and its conversion into sugar.—*Chas. H. Otis.*

2107. DONKIN, J. E. **Chinese lucerne.** *Jour. Dept. Agric. Union South Africa* 3: 257-258. 1921.—This is a short note on the culture of this variety of lucerne.—*E. M. Doidge.*

2108. DONKIN, J. E. **Growing lucerne for seed.** *Jour. Dept. Agric. Union South Africa* 3: 446-448. 1921.—This is a short note on the growing of lucerne for seed, a matter of increasing importance owing to the restrictions on the importation of lucerne seed.—*E. M. Doidge.*

2109. DONKIN, J. E. **Imported lucerne, wheat, etc., tested at Grootfontein.** *Jour. Dept. Agric. Union South Africa* 3: 539-541. 1922.—This is a short report on seeds imported from America, Australia, India, and elsewhere. No very conclusive results have been attained.—*E. M. Doidge.*

2110. EDWARDS, H. T. **The production of binder-twine fiber in the Philippine Islands.** *U. S. Dept. Agric. Bull.* 930. 19 p., 4 fig. 1920.—Most of the binder-twine on the market is made of henequén fiber from Yucatan. The area devoted to the cultivation of sisal, *Agave sisalana*, and Manila maní, *Agave cantala*, in the Philippines increased from about 8,000 acres in 1912 to more than 28,000 in 1919. As a result of cooperation between the U. S. A. Department of Agriculture and the Philippine Bureau of Agriculture, machine cleaning for sisal and Manila maní fibers has been commercially established in the Philippines.—*Lyster H. Dewey.*

2111. ESTRADA, MARIO. **El cañamo, su cultivo en la Republica Argentina.** [Hemp, and its cultivation in the Argentine Republic.] *Nuestra Tierra* 5: 338-346. 11 fig. 1921.—Hemp, *Cannabis sativa*, is cultivated successfully in Chile and the conditions of soil and climate



in certain parts of Argentina are regarded as favorable. It has been tried experimentally near Pergamino, Mendoza, and in 1920-21, 420 hectares were grown in Tunuyan. Hemp seed from Chile, Kentucky, Syria, China, and Japan were tested. The plants grew well but the statements and the illustrations show that the harvest was delayed too long to secure good fiber.—*Lyster H. Dewey.*

2112. FISHER, F. The growth of leguminous crops. Jour. Dept. Agric. Union South Africa 3: 527-538. 1921.—These cultural notes on a number of leguminous plants which are suited to South African conditions include cowpeas (*Vigna* sp.), soy beans, the ground nut (*Arachis hypogaea*), vetches (*Vicia sativa* and *V. villosa*), lupines, and beans.—*E. M. Doidge.*

2113. FRAPS, G. S. The composition and value of wheat by-products. Texas Agric. Exp. Sta. Bull. 282. 42 p. 1921.—This bulletin contains 23 tables giving composition, food values, results of digestion experiments, etc.—*L. Pace.*

2114. FRIEBE. Der Einfluss der Saatzeit auf den Proteingehalt der Gerstenkörner unter besonderer Berücksichtigung der Eignung der Gerste zu Brauzwecken. [The influence of time of seeding upon the protein content of barley, with special reference to its suitability for brewing.] Fühling's Landw. Zeitg. 70: 296-307. 1921.—Hanna and Goldthorpe, 2 typical varieties of barley, were seeded March 25, April 3, April 19, and May 5, on 3 kinds of soil,—light sandy, medium loam, and heavy clay. The protein content of the grain increased steadily from the earliest to the latest seeding, whereas the proportion of good grain diminished as the date of seeding became later. The yields also diminished with the later seedings. A good grade of barley for brewing should contain about 10.5 per cent of protein. The best grade was secured from the 2 earlier seedings on the loam soil, averaging 10.24 per cent of protein. The 3rd seeding averaged 11.9 and the 4th 15.45 per cent of protein. All seedings on the clay and sandy soils were too high in protein content, ranging from 11.3 in the earliest seeding to 16.7 in the latest seeding on the sandy soil and from 12.2 in the earliest seeding to 16.2 in the latest seeding on the clay soil. The highest percentage of good grain was obtained from the earlier seedings on loam soil.—*A. T. Wiancko.*

2115. FYNN, H. C. K. Statistics of crops grown by Europeans in Southern Rhodesia for the season 1920-1921. Rhodesia Agric. Jour. 19: 29-36. 1922.—This report includes: (1) statistical statement of crops 1920-1921; (2) districts in order of acreage of cultivated land; (3) cultivated crops in order of area in 1920-21; (4) acreage in relation to class of crop; (5) number of farms and ranches by districts.—*E. M. Doidge.*

2116. HALL, W. S. Annual white sweet clover. Jour. Dept. Union South Africa 3: 463-465. 1921.—The annual white sweet clover is attracting much attention in America because of its promise as a legume in short rotations and its value as a forage crop. It is being tested at Cedara Experiment Station with a view to ascertaining its agricultural value in South Africa. The plant is described and cultural directions are given.—*E. M. Doidge.*

2117. HARRIS, F. S. The duty of water in Cache Valley, Utah. Utah Agric. Exp. Sta. Bull. 173. 16 p., 9 fig. 1920.—This is a summary of 17 years of irrigation experiments, giving in brief the water requirements of certain crops, both as to amount of water and its distribution through the season.—*B. L. Richards.*

2118. HARRIS, F. S., AND D. W. PITTMAN. Relative resistance of various crops to alkali. Utah Agric. Exp. Sta. Bull. 168. 23 v., 70 fig. 1919.—In a series of experiments to test the alkali resistance of various crops and crop varieties it was found that the cereals were the most resistant of the crops tested. Among forage crops, vetches, cowpeas, alfalfa, and sweet clover were found superior to the grasses and to alsike clover. A wide range of tolerance was noted in different crop varieties.—Results show that salts added to the soil in concentrations greater than 4,000 parts per million of chlorides, 8,000 parts per million of carbonates, and 12,000 parts per million of sulphates are too high to allow a satisfactory yield of the ordinary crops.—*B. L. Richards.*

2119. **HASELHOFF, E.** *Gründung auf leichtem und schwerem Boden.* [Green manuring on light and heavy soils.] *Fühling's Landw. Zeitg.* 70: 407-418. 1921.—Attention is called to the large amounts of organic matter and nitrogen that may be added to the soil by the growing and plowing under of leguminous crops, an especially important matter at this time in Germany on account of the scarcity and poor quality of manure due to post-war conditions. The results of experiments are cited showing that green manuring crops of Serradella, red clover, and a mixture of peas and vetches produced 21,020, 24,950, and 22,790 kgm. of green substance, respectively, containing 3,227, 3,383, and 6,251, kgm. of organic matter and 65,110, and 145 kgm. of nitrogen, respectively, per hectare as compared with 3,805 kgm. of organic matter and 79 kgm. of nitrogen in 20,000 kgm. of manure. To evaluate these materials in the soil, equal amounts were incorporated in enclosed parcels of earth of 1 gm. surface and the amounts of carbon dioxide produced to the depth of 25 cm. determined during 1 year and 3-year periods. The amounts of carbon dioxide produced the 1st year were 33 mgm. in the untreated soil, 66 in the soil treated with manure, 50 in that treated with Serradella, 45 in that treated with red clover, and 38 in that treated with peas and vetches. The amounts of carbon dioxide produced in 3 years were 138, 179, 195, 168, and 179 mgm. respectively. Regarding nitrogen, it is shown that a good leguminous green-manuring crop will add 100 kgm. of nitrogen to the soil per hectare and that such nitrogen is not inferior to that in manure. Furthermore, the growth of leguminous green manuring crops has a pronouncedly beneficial effect on the physical condition of the soil. Experiments are reported showing that leguminous green-manuring crops can be used to advantage after summer-harvested crops and that such seedings should be made as soon as possible after harvest in order to secure the largest benefits. Seedings of vetches were made on July 19, August 5, and August 31. These crops added to the soil 122, 79, and 31 kgm. nitrogen per hectare, respectively, showing the importance of early seeding. Attention is also called to the benefits of seeding clover in small grain crops in the spring. Large crop increases due to green manuring are reported.—A. T. Wiancko.

2120. **HEINRICH, M.** *Die Abhängigkeit der Keimtriebkraft vom Keimmedium und ihre Beeinflussung durch verschiedene Beizmittel.* [The dependence of strength of germination upon the germination medium and the influence of different fungicides.] *Landw. Versuchssta.* 98: 65-115. 1921.—For practical purposes it is important to determine the strength of germination of seed as well as the total germination. Fine, medium, and coarse sands of different degrees of moisture were compared as germination media, using different depths of covering of the seed. Fine sand containing 15 per cent of water by weight proved most favorable. As a covering dry coarse sand 1-1.25 mm. diameter was found to be best. Fine, moist sand is objectionable on account of crusting. The depth of covering with dry sand may vary from 3 to 5 cm. without material difference in the results. Aeration of the container through the bottom or sides was found unnecessary; glass beakers proved satisfactory. A method is described using glass beakers 20 cm. high and 12 cm. in diameter. The beakers are filled to within 4 cm. of the top with fine quartz sand containing 15 per cent by weight of water. This is pressed down to 5 cm. below the top. The seed are planted germ end down and covered with 3 cm. of dry coarse sand. The beakers are then covered with plates of glass and kept at 18-20°C. When the first sprouts touch the cover, the strong healthy ones are counted and cut off. The dry sand is then shaken off until the seeds are visible. All sprouts can then be examined for disease or other defects. Tests of formaldehyde- and Uspulun-treated seed showed that formaldehyde had a depressing effect on germination, Uspulun a decidedly favorable effect.—A. T. Wiancko.

2121. **HEINRICH, M., UND H. FUNKE.** *Beziehungen zwischen Reinigung des Saatguts und Ernteertrag.* [Relation between grading of seed grains and crop yields.] *Fühling's Landw. Zeitg.* 70: 116-117. 1921.—This is a preliminary report on the grading of 3 lots each of special and ordinary oats, showing that the grain as it comes from the thresher may be very materially improved for seeding purposes by grading out the lighter and poorer seed, resulting in all cases in considerably higher crop yields.—A. T. Wiancko.

2122. HEWS, R. D. Cost of producing an acre of potatoes in Aroostook County—1921. *Potato Mag.* 47: 14. 1922.—Estimates from 5 growers of Aroostook County, Maine, averaged \$245 an acre. The average cost per bushel for production, storage, and placing on the local market is estimated at \$1.09.—*Donald Folsom.*

2123. HOFFMANN. Die Beeinflussung der Tabakernten in quantitativer und qualitativer Hinsicht durch Massnahmen der Düngung nach dem heutigen Stande einschlägiger Erfahrung. [Influencing the yield of tobacco quantitatively and qualitatively by fertilizing in accordance with the present status of experience.] *Mitteil. Deutsch. Landw. Ges.* 37: 181-183. 1922.—In this general review of the experience of German farmers the great need of potash is emphasized. Phosphoric acid is to be avoided as much as possible. The influence of nitrogen on the odor of tobacco is pointed out.—*A. J. Pieters.*

2124. HOLDEN, JAMES A. The work of the Scottsbluff reclamation project experimental farm in 1918 and 1919. U. S. Dept. Agric. Dept. Circ. 173. 36 p. 1921.—In this discussion of progress, conditions, and crop experiments with alfalfa seeding and rotation, Turkestan, common alfalfa, sweet clover, and sugar beets are compared, and variety tests of mangels, potatoes, and corn are reported.—*L. R. Hesler.*

2125. HUGHES, H. D., AND F. S. WILKINS. Soy beans in Iowa. Iowa Agric. Exp. Sta. Circ. 65. 4 p. 1920.—Soy beans provided a dependable crop in Iowa, production from the better varieties ranging from 15 to 25 bushels of seed and 2½-3½ tons of hay per acre. The beans may also be grown with corn to be pastured.—*Florence S. Willey.*

2126. HUGHES, H. D., AND F. S. WILKINS. Sudan grass in Iowa. Iowa Agric. Exp. Sta. Circ. 66. 4 p. 1920.—Sudan grass is recommended as a good non-leguminous emergency hay crop in Iowa. It surpasses millet or oats in yield and is nearly equal in feeding value. Since it does not take its nitrogen from the air it is not recommended in regular crop rotation.—*Florence S. Willey.*

2127. JOHNSON, E. C. Thirtieth annual report. Washington [State] Agric. Exp. Sta. Bull. 158. 47 p. 1920.—This contains brief divisional reports of experimental work, of which the following are of interest to botanists: In Farm Crops,—field crop varieties, cultural practices, forage crops, plant breeding laws, and crop rotations by E. G. SCHAFER; in Horticulture,—apple rosette, orchard cover crops, renovation of prune orchards, fruit storage, and seed potato production, by O. M. MORRIS; in Plant Pathology,—summary of results on wheat smut (*Tilletia tritici*), including the spore load in relation to the percentage of smut which appears in the crop, resistance of varieties, amount of smut in seedlings at different dates, various seed treatments—including the lime after-bath for preventing seed injury, and a report of new or little known diseases, by F. D. HEALD; in Soils,—fertility work in Western Washington, crop rotation, tillage, and orchard soil investigations, by F. J. SIEVERS,—*F. D. Heald.*

2128. JUMELLE, H. Les huiles végétales. [The vegetable oils.] *Encyclopedie Industrielle.* 493 p., 125 fig. J. B. Ballière: Paris, 1921.—In this extensive compilation of information on the vegetable oil industry, the 1st hundred pages are devoted to a résumé of the general physical and chemical characters of vegetable oils, a detailed description with illustrations of the processes involved in extracting and refining them, and a discussion of their various industrial uses. The author then discusses in detail more than 325 vegetable oils giving for each the botanical origin so far as known, place of production, methods of collecting and preparing the source material, principal characteristics, and uses. The work is concluded by a short chapter on vegetable waxes. [See also Bot. Absts. 11, Entry 2098.]—*W. W. Stockberger.*

2129. KENNEDY, E. W. Experience at Condobolin experiment farm. Agric. Gaz. New South Wales 33: 88. 1922.—Until recently Condobolin was considered outside the wheat belt,

but under careful operations fair to good crops have been produced during the past few years. In 1921 a maximum yield of 22 bushels per acre was secured. Principles of wheat growing are briefly discussed.—*L. R. Waldron.*

2130. KERPART, L. W., AND R. MCKEE. **Hairy-vetch seed production in the United States.** U. S. Dept. Agric. Bull. 876. 32 p., 7 fig. 1920.—The production of hairy vetch seed in various parts of the U. S. A. is discussed in detail as regards growing the crop, harvesting, thrashing, cleaning, and marketing. Considerable hairy vetch seed is imported annually into the U. S. A., the amounts for the years 1905-1919 varying from 67,683 to 4,547,824 pounds. The annual production in the U. S. A. for 1915-1919 was about 1,000,000 pounds, the greater part being produced in Michigan. Many widely separated localities in the Atlantic and Gulf Coast States produce small amounts of seed. It is contended that it is desirable to grow more seed on the farm for home use.—*Roland McKee.*

2131. KRÜGER, W. **Zeit und Streitfragen auf dem Gebiete des Zuckerrübenbaues.** [Current and controversial questions in the field of sugar beet culture.] Mitteil. Deutsch. Landw. Ges. 37: 217-220. 1922.—In this address the author briefly discusses the questions of selection, fertilizers, green manuring, crop rotations, culture, etc.—*A. J. Pieters.*

2132. LANSDALL, K. A. **Weeds of South Africa. IV. Dissemination of weeds.** Jour. Dept. Agric. Union South Africa 3: 366-372. Fig. 60-64. 1921.—The various methods of seed dispersal are discussed and illustrated and a schedule given of methods by which the seed of common weeds are distributed.—*E. M. Doidge.*

2133. LANSDALL, K. A. **Weeds of South Africa V.** Jour. Dept. Agric. Union South Africa 3: 456-462. 1921.—This is a continuation of previous articles on the subject [see Bot. Absts. 10, Entry 1828] and deals chiefly with the eradication of weeds by sprays and manures. Certain experiments on weed destruction carried out during 1919-1920 are recounted.—*E. M. Doidge.*

2134. LEMMERMANN, O., UND H. WIESSMANN. **Düngungsversuche mit Magnesiumsulfat.** [Fertilizing experiments with magnesium sulphate.] Landw. Jahrb. 55: 273-276. 1920.—It was shown that very large applications of magnesium sulphate to rye and barley had no effect on the yield of straw or grain.—*A. J. Pieters.*

2135. LEMMERMANN, O., UND H. WIESSMANN. **Versuche über eine etwaige schädliche Wirkung von Sodakalk und Boraxkalk.** [Investigations on a possible harmful effect of soda lime and borax lime.] Landw. Jahrb. 55: 277-280. 1920.—The waste lime from borax factories used contained 0.745 per cent  $B_2O_3$ . Rye and potatoes were grown. Marl, soda lime, borax lime, and no lime plots were laid out in triplicate on a field otherwise uniformly fertilized. The various limes were applied at the rate of 4000 pounds per hectare. These forms of lime are said to have had no influence on the yields.—*A. J. Pieters.*

2136. LITTLE, L. G. **Sunflowers vs. maize as silage.** Agric. Gaz. New South Wales 33: 20. 1922.—Under similar conditions silage yields, in tons per acre, were secured as follows: maize 5, sunflowers 4.5, Sudan grass 2.5, and sorghum 2.3. The quality of silage shown in practical feeding was in the following order: sorghum, sunflowers, maize, and Sudan grass.—*L. R. Waldron.*

2137. LOCHON, JR., VON. **Die Grundlagen des deutschen Kartoffelbaues.** [The fundamentals of German potato culture.] Mitteil. Deutsch. Landw. Ges. 37: 160-163. 1922.—In this address the author considers problems and methods of culture, harvesting, and marketing.—*A. J. Pieters.*

2138. LOEW, OSCAR. **Einige Bemerkungen zu den Kalk-Magnesiaversuchen von D. Meyer.** [Some remarks on the lime-magnesia investigations of D. Meyer.] Landw. Jahrb.

50: 705-708. 1921.—This is a criticism of Meyer's work on the effect of lime and magnesia on oats and *Vicia faba* in field cultures, the conclusions of which differ from those reported by Loew.—A. J. Pieters.

2139. McCauley, C. Field experiments with winter fodders. Cowra experiment farm. Agric. Gaz. New South Wales 33: 11-12. 1922.—Sunrise and Algerian oats gave highest yields, the former yielding over 11 tons per acre, green weight. The varieties of wheat used proved unsuitable. Canary grass proved very susceptible to take-all.—L. R. Waldron.

2140. McLeod, Charles. Indian jute. (*Corchorus* spp.) Asiatic Rev. 17: 302-306. 1921.—Cultivation of jute in India is described with special reference to soils, manuring, seedling, harvesting, and preparation, packing, marketing and uses of the fiber.—Lyster H. Dewey.

2141. Mainwaring, C. White and yellow maize. A comparison. Rhodesia Agric. Jour. 18: 612-615. 1921.—Rhodesia has for some years determined to produce only 1 class of maize for export, namely "Flat White." The advantages and disadvantages of this plan are discussed.—E. M. Doidge.

2142. Makin, R. N. Sudan grass on the south coast. Agric. Gaz. New South Wales 33: 55. 1922.—Experiments have shown that Sudan grass can not compare with maize or sorghum as silage or ensilage in point of yield for the district and it is not ranked high for pasture.—L. R. Waldron.

2143. Mundy, H. G. Annual report of experiments 1920-21. Experiment station, Salisbury. Rhodesia Agric. Jour. 18: 604-612. 1921; 19: 45-52. 3 pl. 1922.—This includes a report on rotation and other experiments with maize, including date of planting, spacing, and seed selection. Other matters considered are sweet potato variety trials, buckwheat, summer oats and wheat for grain production, ground nuts, velvet beans, and hay crops.—E. M. Doidge.

2144. Mundy, H. G. Annual report of crop experiments 1920-21. Gweli experiment farm. Rhodesia Agric. Jour. 18: 616-620. 1 pl. 1921.—This report is concerned chiefly with rotation experiments including maize.—E. M. Doidge.

2145. Mundy, H. G. Arlington sand veld experiment station. First report. Winter crops 1921. Rhodesia Agric. Jour. 18: 595-599. 1921; 19: 68-72. 4 pl. 1922.—This is a record of experiments carried out on the moisture-retaining vlei soils of the sand veld for the production of winter wheat, rye, barley, oats, and other crops.—E. M. Doidge.

2146. Mundy, H. G. Florida beggar weed, (*Desmodium tortuosum*). Rhodesia Agric. Jour. 18: 504-505. 1 pl. 1921.—For some time the Department of Agriculture has recommended beggar weed as a valuable leguminous crop, suitable for green soiling or for grazing. Details concerning cultivation and irrigation are given. From certain experimental plots 6 cuttings were obtained with a total yield of not less than 12,000 pounds.—E. M. Doidge.

2147. Nicholson, G., and M. J. E. Squire. Field experiments with cereals. Agric. Gaz. New South Wales 33: 79-87. 1922.—At Nyngan experiment farm 13 varieties of wheat were under trial in 1921. For the early planted trials Gluyas' Early, Canberra, and Gresley gave best results for both hay and grain. Canberra gave best results for both hay and grain in the late planted trials. Results are given from different cultivation experiments, with notes on a few of the varieties. At the Trangie experiment farm the varieties Bomen, Florence, and Hard Federation were the highest yielding varieties for grain and for hay, for both early and mid-season planting.—L. R. Waldron.

2148. Nolte, O. Ueber Antagonismus. [Concerning antagonism.] Landw. Jahrb. 55: 237-291. 1920.—Especially reference is made to the work of E. von Wolff in 1866-68, and tables are given showing Wolff's results in replacing 1 chemical with another.—A. J. Pieters.

2149. OLIN, W. H. **Cost of producing an acre of potatoes in the San Luis Valley, Colorado.** *Potato Mag.* 4: 12. 1922.—An account on 1 farm in 1921 showed that the cost of production and marketing was about 133 dollars per acre, or about 25 cents a bushel.—*Donald Folsom.*

2150. OOSTRUIZEN, J. DU P. **Cotton: ratooning experiments.** *Jour. Dept. Agric. Union South Africa* 4: 125-131. 4 fig. 1922.—The results of experiments carried out at Rustenburg show that ratooning does not increase the yield of cotton; that there appears to be a difference between the quality of 1st-year and ratooned cotton, the lint from ratooned fields showing signs of deterioration; and that as a general rule ratooned fields are more infested with cotton pests than 1st-year cotton.—*E. M. Doidge.*

2151. PAMMEL, L. H., AND C. M. KING. **Seed analyses of 1913 to 1921.** *Iowa Agric. Exp. Sta. Bull.* 203. 27-43. 1921.—In this period 8,478 samples of seed were submitted to the station for analysis. A list is given of weed seeds occurring in the grain seeds considered. The weed content indicates where the seed was grown. For the most part the seed samples were: red clover, alfalfa, alsike clover, sweet clover, timothy, millet, bluegrass, Sudan grass, brome grass, white clover, lawn grass mixtures, rape, wheat, oats, and miscellaneous commercial seeds. Noxious seeds contained in such quantity in the seed samples as to make them illegal for the state were as follows: Canada thistle, wild mustard, dodder, wild oats, quack grass, and corn cockle. Fungus diseases, such as ergot, are distributed in commercial seed. Foul weed seeds are sometimes spread by screenings. It is recommended that crops for seed production be examined in the field.—*Florence Willey.*

2152. POFF, M. **Die Steigerung der Ernteerträge durch geeignete Boden-Desinfektion.** [Increasing yields by proper soil disinfection.] *Landw. Jahrb.* 55: 549-579. 1921.—After reviewing the literature, the author reports pot and field experiments on the effect of Humuskarbolinum and similar substances. The yields of barley, oats, beets, potatoes, cabbage, carrots, and bush beans were increased, sometimes materially. It was also found that applying 10-15 gm. of Humuskarbolinum per plant controlled Plasmodiophora of cabbage except in very badly infested fields. The details of crop weights for each experiment are tabulated.—*A. J. Pieters.*

2153. PRIDHAM, J. T. **Three English wheats.** *Agric. Gaz. New South Wales* 33: 87. 1922.—The 5 English wheat varieties, John Bull, Pedigree Snowdrop White, Harvester, Yeoman, and Fenman have proved unsuitable for conditions in New South Wales.—*L. R. Waldron.*

2154. REYNOLDS, M. H., G. C. SPARKS, AND R. N. MAKIN. **Farmers' experiment plots. Potato experiments, 1920-1921.** *Agric. Gaz. New South Wales* 33: 27-35. 1 fig. 1922.—In the New England district 10 farmers cooperated and 10 varieties were tested. Varieties Surprise and Coronation gave best results. Manuring showed no immediate beneficial effect due to dry weather at a critical period. In the southern district 4 farmers cooperated and 13 varieties were tested. Best results were secured from the Factor variety. In the southern highlands, Factor and Magnum Bonum gave most satisfactory results. Detailed results are tabulated.—*L. R. Waldron.*

2155. RINDL, M. **Ground nuts as a source of oil.** *South African Jour. Indust.* 5: 38-45. 1922.—This article is written with the view of encouraging the growing of ground nuts (*Arachis hypogaea*) in the Union of South Africa, particularly in the warmer parts of Natal and the Transvaal. Statistics of the production of this crop in Rhodesia, prices, and best methods of planting, etc., are given.—*S. M. Stent.*

2156. RINDL, M. **Ground nuts as a source of oil: 2.** *South African Jour. Indust.* 5: 36-90. 1922.—The commercial value of ground nuts (*Arachis hypogaea*) is discussed. Analyses are given of the oils of different varieties grown in different localities. A note on the Bambarra ground nut, *Voandzeia subterranea*, which has no value as an oil-producer, is included.—*S. M. Stent.*

2157. ROSA, J. T. JR. Seed studies with Irish potatoes. Missouri Agric. Exp. Sta. Bull. 191. 32 p. 1922.—Variety and strain tests over 4 years indicate that Early Ohio and Irish Cobbler are the only varieties adapted for the spring crop in Missouri. Several varieties were found suitable for the fall crop. A wide range in productivity between different strains of the same variety is reported. Certified potatoes from northern and western states are recommended for seed. Home-grown seed potatoes of the fall crop approached northern grown seed in quality and yield, producing a much smaller percentage of cull potatoes than spring-grown seed of the same varieties. Greening and sprouting seed potatoes reduced the yield. Total yield increased with the size of the seed-piece planted, but the most profitable size was little beyond 1 ounce. Cut seed gave better yields of No. 1 potatoes than the whole tuber. The average number of tubers per stalk tends to be a varietal characteristic but may be affected markedly by soil and weather conditions.—*L. J. Stadler.*

2158. ROSENFELD, ARTHUR H. Big yields and more technical supervision. Internat. Sugar Jour. 24: 131-132. 1922.—Technical supervision of the cane-fields is advocated.—*C. Rumbold.*

2159. ROSENFELD, ARTHUR H. The question of the distance between cane rows. Internat. Sugar Jour. 24: 72-76. 1922.—A brief résumé is given of the results of field experiments on the effect on the sugar tonnage per hectare of varying distances between the rows of sugar cane. The distance between the rows was varied from 3 to 8 feet. W. C. Stubbs in Louisiana found that with Louisiana Striped and Purple cane (Cheribon) rows 5 feet apart gave best results. In Hawaii R. E. Blouin's experiments with Lahaina cane planted at 4, 5, 6 and 8 feet showed that 5-foot rows are best. Reynoso says  $5\frac{1}{2}$  feet is the ideal distance in Cuba, and Boname, that  $4\frac{1}{2}$ -5 feet is best in Guadeloupe. Large station experiments with various canes in Tucuman Province, Argentina, carried on by Blouin, W. E. Cross, and Rosenfeld from 1910 to 1919, showed that sugar cane should be planted in rows as close together as is consistent with proper machine cultivation. This distance is about 5 feet for the thick type of cane such as Cheribon, Lahaina, etc., and from  $5\frac{1}{2}$  to 6 feet for the more abundantly suckering types such as the Java canes, the Uba, and the Bamboo class.—*C. Rumbold.*

2160. ROTHGEB, BENTON E., AND JOHN B. SIEGLINGER. Broom-corn experiments at Woodward, Okla. U. S. Dept. Agric. Bull. 836. 53 p., 7 fig. 1920.—The 5-year results obtained from varietal and cultural experiments with broom-corn at Woodward, Oklahoma, show that all varieties produce high yields in favorable seasons, but only adapted varieties yield well in less favorable seasons. Dwarf broom-corn made higher yields than the standard broom-corn because it is better adapted to prevailing conditions. Both groups tend to produce suckers, but the tendency is greater in the dwarf than in the standard. Environmental conditions largely influence suckering and the length and quality of the brush. Thick stands produce short brush, thin stands long coarse brush. The best dates for planting proved to be the 1st half of May or the last half of June, as these dates enabled the crop to head either before or after the usually dry, hot weather about the middle of August. Plants 6-8 inches apart in rows  $3\frac{1}{2}$  feet apart gave best results. Nothing was gained by spacing the rows 7 feet apart and doubling the number of plants in the row, giving the same number of plants to a given area. Harvesting when the seed were in the dough stage gave a higher yield and better quality of brush than that harvested earlier.—*Benton E. Rothgeb.*

2161. ROWNEY, L. F. Rate-of-seeding experiment with maize. Agric. Gaz. New South Wales 33: 38. 1922.—At Grafton in 1921, with rainfall above the average, maize planted in rows 8 feet apart yielded less than maize planted in rows 5 feet apart.—*L. R. Waldron.*

2162. RUDKIN, S. Harvest report, 1921. Nyngan experiment farm. Agric. Gaz. New South Wales 33: 95-96. 1922.—Yields of wheat for grain, hay, and silage are given for the various fields of the Nyngan experiment farm.—*L. R. Waldron.*

2163. RÜMKE, K. VON. Die Saatenanerkennung, ihre augenblickliche Lage und ihre Bedeutung für die landwirtschaftliche Produktion. [Seed certification, its present status and its significance in agricultural production.] Mitteil. Deutsch. Landw. Ges. 37: 207-210. 1922.—The author reviews the history of the efforts of the German Agricultural Society to promote seed improvement, and to organize for the production of pedigreed seed. He points out that a register of pedigreed stock to be of value must be national as separate provincial registers would create confusion. He also urges the establishment of certain outlined rules and principles, and that seed certification be carried on by voluntary associations rather than through governmental agencies.—A. J. Pieters.

2164. SCHERFFIUS, W. H. The future of the tobacco industry in South Africa. Jour. Dept. Agric. Union South Africa 4: 224-227. 1922.—The future of the tobacco industry in South Africa involves several questions. Some serious troubles are developing in the up-country districts, the tobacco slug or beetle (*Lema bilineata* Germar) is becoming a serious pest, and even more serious is the occurrence of wild fire and angular spot (*Bacterium tabacum* and *B. angulatum*). The tobacco industry will never assume large proportions until cooperation is practised more extensively and more consideration is given to obtaining an overseas market.—E. M. Doidge.

2165. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Kaliversuche. [Potash investigations.] Landw. Jahrb. 55: 40-45. 1921.—The effects of chlorate of potash, potassium sulphate, Phonolith, Vulcan-phonolith, and Leuzit on potatoes, fodder beets, and oats in various soil types are tabulated and discussed.—A. J. Pieters.

2166. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Phosphorsäureversuche. [Phosphoric acid investigations.] Landw. Jahrb. 55: 21-39. 1921.—Tables are given containing results with Thomas-meal and superphosphate on oats and beans, and with Thomas meal only on oats, white mustard, and rye grass, in some cases both with and without lime. The results are briefly discussed.—A. J. Pieters.

2167. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Vergleichende Versuche mit Natronsalpeter, Kalksalpeter (Norgesalpeter) und Kalknitrit. [Comparative investigations with sodium nitrate, calcium nitrate, and calcium nitrite.] Landw. Jahrb. 55: 1-20. 1921.—The results of tests on sand, sandy loam, and clay with oats, potatoes, and fodder beets are reported in tabular form and briefly discussed.—A. J. Pieters.

2168. SCHURIG. Neue Erfahrungen im Zuckerrübenbau. [Recent experiences in sugar beet culture.] Mitteil. Deutsch. Landw. Ges. 37: 220-223. 1922.—These are personal practical experiences in sugar beet culture.—A. J. Pieters.

2169. SCOFIELD, C. S. Effect of alfalfa on the subsequent yields of irrigated field crops. U. S. Dept. Agric. Bull. 881. 13 p. 1920.—The effect of alfalfa, grown for 2 or 3 years in a rotation, on subsequent yields of Irish potatoes, oats, and sugar beets grown under irrigation has been tested for 6 years at 3 stations in the northern Great Plains. At Scottsbluff, Nebraska, where the soil is a light sandy loam, the alfalfa has increased the yield of potatoes about 100 bushels per acre and the proportion of marketable tubers 12 per cent, the yield of oats 6 bushels per acre, and that of sugar beets 3.4 tons per acre. At Belle Fourche, South Dakota, where the soil is a heavy clay loam rich in organic matter, alfalfa has had no beneficial effect on potatoes and that on oats and sugar beets has been insignificant. At Huntley, Montana, on productive clay loam alfalfa has increased the yield of potatoes about 50 bushels per acre without, however, increasing the proportion of marketable tubers, which has been relatively high on all plots. The alfalfa apparently increased the yield of oats about 11 bushels per acre and of sugar beets 1.5 tons per acre. At Scottsbluff alfalfa proved more beneficial to potatoes than did farm manure. With other crops and at the other stations the differences were less striking and generally in favor of the farm-yard manure.—H. L. Westover.



2170. SELLERGREN, GUSTAF. *Inhemska fibervaxter: Linum usitatissimum*. [Native fiber plants.] K. Landbr.-Akad. Handl. o. Tidskr. 5: 388-424. 13 fig. 1921.—*Linum usitatissimum* is the only species of *Linum* which produces fibers suitable for spinning. Flax was brought to Sweden in the latter part of the stone age. A study of the plant, illustrated, shows that the root contains no fiber; the stem just above the root contains coarse fibers lignified; the middle and upper portions finer fibers, less lignified and forming a greater proportion of the total cross section. Two types are described,—type A (seed flax) with numerous branches and root about  $\frac{1}{2}$  the length of the stem, and type B (fiber flax) with few branches and root about  $\frac{1}{10}$  the length of the stem. The proportion of short fibers forming tow is increased from 50 to more than 70 per cent by fertilizing sandy soil with humus. Microscopic studies show that nitrogenous fertilizers produce coarser ultimate cells in the fiber bundles with wider spaces between the cells. The method of "cottonized flax" (the separation into ultimate cells for spinning) is discussed at length with the conclusion that it is not feasible. Dew-retting, water-retting, and bacterial retting, and special processes are discussed.—It is pointed out that the fine cross lines of the ultimate fiber cells often mentioned as characteristic of flax are not inherent in the fiber, but result from sharp bending in preparing the fiber.—Flax cells from mummy wrappings more than 3,000 years old resemble the present flax, but are finer.—The walls of cells composing flax fibers are themselves composed of extremely fine filaments.—Standardizing the grades of flax is strongly urged and suggestions for grades are given.—L. H. Dewey.

2171. SELLSCHOP, JACQ. P. F. Maize growing competition for lads, Transvaal Province, 1920-1921. Jour. Dept. Agric. Union South Africa 4: 246-251. 1922.—Prizes for maize growing were offered to lads in the High Veld, Middle Veld, and Low Veld areas. There were 86 entries for the competition, and the results are given in detail.—E. M. Doidge.

2172. SHEPHERD, A. N. Farmers' experiment plots. Winter green fodder trials, 1920-1921. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 33: 89-91. 1922.—Oats, barley, and vetches gave higher yields than wheat. Yields were increased by use of various manures.—L. R. Waldron.

2173. SHRADER, J. H. The castor-oil industry. U. S. Dept. Agric. Bull. 867. 40 p., 15 fig. 1920.—This bulletin includes a discussion of the source of castor oil, statistics of the trade and commerce in castor beans and castor oil for the years 1910-1918, an illustrated description of the processes involved in the manufacture of castor oil, including solvent extraction, data on the analysis of castor oils from different sources, and an account of the various uses of castor oil.—W. W. Stockberger.

2174. SMIT, B. J. The uses of tobacco waste. Jour. Dept. Agric. Union South Africa 4: 267-271. 1922.—Considered solely as a fertilizer, tobacco would at present be worth less than 1d. per pound. During the process of manufacturing tobacco extract most of the fertilizer constituents are removed, making the residue of little value.—E. M. Doidge.

2175. SNELL, K. Systematik der Kartoffelsorten. [Taxonomy of potato varieties.] Fühl-ing's Landw. Zeitg. 70: 14-19. 1921.—This is a discussion of the identification and classification of potato varieties according to certain plant characters other than the peculiarities of the tubers, including the color of daylight sprouts, color of blossoms, stems, and leaves and form and character of leaf. The author holds that color distinctions in daylight sprouts, such as light green, light green and reddish-violet or bluish-violet, are maintained in the blossoms and that varieties and types can thus be distinguished in seed stock. It is held that the identification and purification of varieties by the recognition of systematic plant characters is important in the development of varieties possessing certain desirable qualities.—A. T. Wiancko.

2176. SOLOMON, X., ET G. VERNET. Valeur alimentaire des fruits de *Pithecolobium saman* Benth. [The food value of the fruits of *Pithecolobium saman*.] Bull. Agric. Inst.

Sci. Saigon 3: 193-196. 1920.—Chemical analyses of the different parts of the pods are given and the forage value of the fruits is discussed.—*E. D. Merrill.*

2177. SPARKS, G. C., AND R. N. MAKIN. Farmers' experiment plots. Maize experiments, 1920-1921. Agric. Gaz. New South Wales 33: 7-9. 1922.—In the southern district a number of farmers cooperated in growing a total of 20 varieties of corn. Maximum yields of over 90 bushels per acre were secured. On the south coast corn planted for ensilage yielded up to 15 tons per acre.—*L. R. Waldron.*

2178. STADLER, L. J. Experiments in field plot technic for the preliminary determination of comparative yields in the small grains. Missouri Agric. Exp. Sta. Res. Bull. 49. 78 p. 1922.—Studies on varietal competition, size for replication of plots and the adjustment of yield by the use of check plots in 8 variety and strain tests of wheat, barley, and oats are reported. The varieties were grown in replicate 5-row blocks. The competing border rows of adjacent sorts gave relative yields widely different from those of interior rows of the same plots. Such competitive effects were greater between different varieties than between different commercial strains of the same variety. A considerable error from competition was noted in tests in which the rows ran north and south as well as in those in which the rows ran east and west. In general, higher yielding varieties were favored in competition, but the reverse frequently occurred. In oats tests quality was most closely related to earliness of heading and maturity, but was also related to yield. In wheat tests quality was related fairly closely to both yield and earliness, and in barley tests it was not significantly correlated with any of the characteristics studied. A significant correlation between competition and height was found in 1 wheat variety test. Competition showed no relation to grain-straw ratio. Three-row plots with border rows discarded were somewhat more variable than 5-row plots with border rows discarded, but the differences were not sufficient to outweigh the advantage in size. Plot variability was greater with increase in the size of the experiment field. The variability of 120 distributed check plots of Kherson oats differed widely from that of 120 distributed plots of Red Rustproof oats adjacent in each case to the Kherson plots.—Adjustment of plot yields on the basis of the yields of check plots was effective on 3 fields, characterized by high plot variability, and was ineffective on 5 fields, characterized by low plot variability. In the test in which both Kherson and Red Rustproof were used as check varieties, the Kherson check plots were more effective for adjusting the yields of the Kherson strains tested, whereas the Red Rustproof check plots were more effective for adjusting the yields of the Red Rustproof strains tested. The relative variability of different parts of the fields as determined by these 2 check varieties differed greatly and the correlation between the yields of adjacent Kherson and Red Rustproof check plots was not statistically significant.—*W. C. Etheridge.*

2179. STENT, SYDNEY M., AND H. A. MELLE. Fodder and pasture grasses of South Africa. III. Star grass. Jour. Dept. Agric. Union South Africa 3: 271-276. Fig. 1-4. 1921.—Star grass, *Cynodon plectostachyum*, is indigenous to British East Africa; it is a perennial, with a prostrate or ascending habit, more erect than Kikuyu, but not equalling the latter's strong root system. It makes a very soft, sweet-smelling hay and according to chemical analysis it has a higher feeding value than any grass known. Its growing period is from October to the end of March, it requires a long warm season, a good soil, and a heavy rainfall to grow to perfection, and is one of the first grasses to be affected by the cold weather; but given suitable conditions it grows faster than Kikuyu.—*E. M. Doidge.*

2180. STEWART, GEORGE. A variety survey and descriptive key of small grains in Utah. Utah Agric. Exp. Sta. Bull. 174. 35 p., 11 fig. 1920.—Several tables give lists of the varieties of small grains found in a field survey of Utah in 1918 and 1919. Oats were nearly standardized to the Swedish Select variety, and barley to the Coast variety. In the case of wheat, 24 varieties were found and these usually mixed with other varieties. A study of the market grades for the 1917, 1918, and 1919 crops likewise shows much "mixed wheat." Keys to the local varieties of wheat and oats are included, with a description of each. Comparative yields show Turkey Red to be the best variety of winter wheat and Dicklow and New Zealand the best spring

irrigated varieties. Sevier, a new wheat found during the survey, has in 1 year's test out-yielded all other spring wheats.—*B. L. Richards.*

2181. STUTZER, A. Schwefelsaures Ammoniak. [Sulphate of ammonia.] Mitteil. Deutsch. Landw. Ges. 37: 211-213. 1922.—The author points out that considerable quantities of sulphuric acid are left in soils when heavy applications of ammonium sulphate are made, referring especially to the practice of topdressing meadows and pastures in order to induce early and heavy growths of grass. He warns of the danger of injuring the fields by excessive acidity if this practice is employed with certain grasses.—*A. J. Pieters.*

2182. TAYLOR, H. W. Common mistakes in growing and handling Virginia tobacco. Rhodesia Agric. Jour. 19: 37-44. Pl. 1-2. 1922.—Methods in vogue in Rhodesia in connection with seed beds, transplanting, fertilizing, topping, harvesting, and curing are criticized and improvements suggested.—*E. M. Doidge.*

2183. TAYLOR, H. W. Notes on the tobacco industry. South African Jour. Indust. 4: 885-889. 1921.—This article is a general review of the tobacco industry as applied to South African needs and conditions. The desirability of acquiring more knowledge on the subject of insect and fungoid diseases of the crop is discussed, also the difficulties experienced by farmers in obtaining direct instruction to improve their methods. Great stress is laid on the growing importance of the industry in South Africa, not only for the production of tobacco for local consumption but also for exportation. In 1912 the exports of tobacco were valued at £24,218 and in 1919 they had increased to £157,460.—*S. M. Stent.*

2184. TAYLOR, H. W. The culture of Turkish tobacco. 1. South African Jour. Indust. 4: 794-799. Pl. 1. 1921.—The climate and soil suitable for culture of Turkish tobacco are discussed. Areas in South Africa where it has become established as a commercial crop are noted, and cultural methods are given in detail from the preparation of the seed bed to harvesting. The stringing and wilting of the leaves is also described.—*S. M. Stent.*

2185. TAYLOR, H. W. The culture of Turkish tobacco. 2. South African Jour. Indust. 4: 856-863. Pl. 2-7. 1921.—In this article is described the curing of the tobacco, treatment after curing, and grading and baling for shipment. Also a list is given of necessary equipment and the approximate cost of production.—*S. M. Stent.*

2186. TAYLOR, H. W. The curing of tobacco. South African Jour. Indust. 4: 727-732. 1921.—An account is given of the various methods of curing tobacco and the types of tobacco cured by each method. The methods described are air-curing, sun-curing, fire-curing, and flue-curing. Of these the 1st is most generally used, as it is simplest and easiest, but, like sun-curing, it is subject to adverse climatic conditions. Fire-curing imparts a peculiar flavor and aroma to the leaf and is not used in South Africa. Flue-curing is the most modern and scientific method. General directions are given for this method, which the grower can modify to suit his particular conditions.—*S. M. Stent.*

2187. TORNAU. Die Bedeutung des Lupinenbaues für den landwirtschaftlichen Betrieb. [The importance of lupine culture in farm management.] Mitteil. Deutsch. Landw. Ges. 37: 236-241. 1922.—In this address the author reviews the history of lupine culture and points out the value of lupines for green manuring and for the production of high protein feeds.—*A. J. Pieters.*

2188. TORNAU. Ein Beitrag zur Frage erblicher Beeinflussung durch äussere Verhältnisse. [A contribution to the question of the influence of environment upon inheritance.] Fühling's Landw. Zeitg. 70: 121-127. 1921.—The author reports comparative trials, under like conditions, of seeds of peas and barley grown continuously for 16 years on (1) well fertilized land and (2) on unfertilized to determine whether the long period of growth under favorable and

unfavorable conditions in each case had affected the relative yielding power. Both kinds of seeds were grown in pots under 2 sets of controlled conditions—fertilized and unfertilized—during the years 1919 and 1920. In the case of peas, the well nourished and the poorly nourished seed gave approximately the same results in both the fertilized and unfertilized pots. In the case of barley, the well nourished seed gave higher yields than the poorly nourished seed in the unfertilized pots, whereas in the fertilized pots there were no appreciable differences. The results are regarded as inconclusive in that it could not be determined whether the seeds represented pure lines or merely mixed populations.—*A. T. Wiancko.*

2189. TOWNSEND, C. O. **The beet-sugar industry in the United States in 1920.** U. S. Dept. Agric. Bull. 995. 58 p., 10 pl. 1921.—This general treatise on all phases of beet-sugar production in the United States includes a history of the industry, various phases of sugar beet culture, and economic problems affecting the industry.—*John A. Elliott.*

2190. TROWBRIDGE, P. F. **Spring wheat in the northwest.** Proc. Ann. Meeting Soc. Promotion Agric. Sci. 40/41: 42-47. 1919-20 [1921].—The author, after reviewing the history of the introduction and use of spring wheat in the Northwest [U. S. A.] and the origin and development of some of the well known varieties of the past, gives a critical description of some popular strains of hard spring wheats grown at the present time.—*Lyman Carrier.*

2191. WALTERS, J. A. T. **The velvet bean.** Rhodesia Agric. Jour. 19: 21-28. 3 pl. 1922.—The velvet bean is without exception the most important leguminous crop in Rhodesia. Directions are given for cultivation and harvesting, also details of experiments in which the velvet bean has been used as a rotation legume with maize and particulars as to the value of the crop as a stock feed.—*E. M. Doidge.*

2192. WARBURTON, C. W., AND T. R. STANTON. **Experiments with Kherson and Sixty Day Oats.** U. S. Dept. Agric. Bull. 823. 72 p., 15 fig. 1920.—This is a compilation of result from varietal experiments with oats, including Kherson and Sixty-Day, which have been conducted under a wide range of soil and climatic conditions in periods varying from 4 to 14 years. Histories and descriptions of the 2 varieties are included, also brief notes on yields of straw, weight per bushel, percentage of hull, and improvement. A general consideration of the numerous data tabulated indicates that the early varieties, Kherson and Sixty-Day, yield well in most of the spring-oat sections of the U. S. A. At more than 50 per cent of the stations, under a wide range of environmental conditions, early varieties have produced higher yields than mid-season and late varieties. Kherson and Sixty-Day have given the best results in the warmer humid, sub-humid and semi-arid sections. Late varieties outyielded mid-season varieties at only a few stations.—*T. R. Stanton.*

2193. WEIRUP. **Anbauversuche mit Bohnen im Jahre 1921.** [Tests of beans in 1921.] Mitteil. Deutsch. Landw. Ges. 37: 178-181. 1922.—The author reports yields of 5 varieties of pole and 3 of bush beans at each of 4 stations.—*A. J. Pieters.*

2194. WHITING, A. L., AND T. E. RICHMOND. **Sweet clover for nitrate production.** Illinois Agric. Exp. Sta. Bull. 233. 255-267. 1921.—The author discusses the characteristics which make sweet clover a valuable green-manure crop, and the studies of other investigators on sweet clover as a green manure. Sweet clover when grown in Illinois on brown silt loam and on gray clay and ploughed under as a green manure for corn, furnishes a large amount of nitrate nitrogen.—*J. H. Lovell.*

2195. WHITTET, J. N. **Bushel weights of sorghum and Sudan grass seed.** Agric. Gaz. New South Wales 33: 93-94. 1922.—Bushel weights in pounds were determined as follows: milo 57, feterita 56, Manchu kaoliang 56, Sudan grass 43, early amber cane 47, and saecaline 56.—*L. R. Waldron.*

2196. WHITTET, J. N. *Kikuyu grass (Pennisetum clandestinum) in Queensland.* Agric. Gaz. New South Wales 33: 35. 1922.—This grass made good growth even during the winter. Up to the present it has shown no indication of head formation in New South Wales.—*L. R. Waldron.*

2197. WIESSMANN, H. *Düngungsversuche mit Eisensulfat. [Fertilizer experiments with iron sulphate.]* Landw. Jahrb. 55: 281-286. 1920.—Iron sulphate applied to winter rye and summer barley at the rate of 200 pounds per hectare slightly decreased the yields, but the differences were too small to warrant any positive conclusions.—*A. J. Pieters.*

2198. WILLARD, C. J., AND L. E. THATCHER. *Experiments with Hubam clover.* Monthly Bull. Ohio Agric. Exp. Sta. 7: 3-18. Fig. 1-7. 1922.—The article compares Hubam clover and biennial sweet clover. Experiments have shown that the annual sweet clover will yield 1-2 tons per acre following a grain crop, only slightly out-yielding the biennial, while the hay of the latter is of much better quality. If the Hubam is sown alone in April, 2 cuttings of hay may be secured, though considerable trouble from weeds may be expected if care is not taken. The protein value of Hubam clover was found to be less than that of the biennial variety. They were found equally sensitive to acid soils. The percentage of nitrogen in the roots of the biennial sweet clover was 4 times that of the Hubam, and the weight of roots to a depth of 1 foot was 7 times greater in the biennial; furthermore, 30 times as much nitrogen per acre was found in the roots of the biennial white sweet clover as in the Hubam. Bee keepers have found Hubam clover valuable as a nectar-secreting plant. The experiments do not show that the Hubam clover is likely to be of much value in the ordinary farm rotation in Ohio.—*R. C. Thomas.*

2199. WOODHOUSE, T., AND P. KILGOUR. *The jute industry from seed to finished cloth.* 133 p., 50 fig. Sir Issac Pitman & Sons, Ltd.: London, 1921.—Jute fiber, now one of the 5 main textile fibers, was first imported into Great Britain in 1822. The cultivation of *Corchorus capsularis* and *C. olitorius*, the retting and preparation of the fiber, and methods of sorting and baling are briefly described. Statistics are given. The remaining portion of the book is devoted mainly to a discussion of mill operations from opening the bales to the finished Hessians or gunnies.—*Lyster H. Dewey.*

2200. WRIGHT, R. C., AND GEORGE F. TAYLOR. *Freezing injury to potatoes when undercooled.* U. S. Dept. Agric. Bull. 916. 16 p., 1 fig. 1921.—The results of a study of freezing injury to 7 commercial Irish potato varieties indicate that potatoes can be undercooled several degrees below their true freezing point without freezing injury, provided there is no ice formation within the tissue. When potatoes are thus undercooled, a more or less slight jar is liable to cause freezing or ice formation. When freezing commences in an undercooled potato, the temperature quickly rises to its true freezing point and remains there for a varying length of time, depending upon the surrounding temperature. Some varieties seem to freeze more readily than others when undercooled.—*R. C. Wright.*

2201. WRIGHT, WILLIAM H. *Beneficial results from the inoculation of canning peas with legume bacteria.* [Abstract.] Absts. Bact. 5: 9. 1921.

2202. ZADE. *Züchtung auf Halmfestigkeit. [Selection for stiffness of straw.]* Fühling's Landw. Zeitg. 69: 449-457. 1920.—This is a discussion of the factors concerned in the lodging of grain crops such as wheat and oats, and a report of tests of methods of determining stiffness of straw for purposes of improvement by selection. It is pointed out that lodging may occur quite independent of stiffness of straw. It may be caused by excessive softening of the ground during rain storms, thus loosening the root hold, especially if the plant has a shallow or weak root development. Length of straw and extent of leaf surface are also important factors. Thickness of straw or of the stem wall are not regarded as important or reliable indications of ability to withstand lodging. Measurements of the ability of the stem to withstand bending

and observation of the strength of root development are regarded as the best guides to improvement by selection. Tests of plants to withstand bending were made on the stem at blossoming time, when the grain was in the milk, and after harvest, using Kraus' apparatus, to determine whether or not correct conclusions could be drawn from tests made on the ripe straw. It was supposed that tests made on the green stem might possibly be a better guide in selection for stiffness, but it was found that tests made on the ripe straw after harvest were fully as trustworthy as tests made on the green stems.—A. T. Wiancko.

2203. ZOOK, L. L. Winter wheat in western Nebraska. Nebraska Agric. Exp. Sta. Bull. 179. 37 p., 8 fig. 1922.—This bulletin reports the effects of 4 different crop sequences on the yields of winter wheat at 4 experiment stations in the Great Plains area, namely, North Platte, Nebraska, Scottsbluff, Nebraska, Akron, Colorado, and Ardmore, South Dakota. The 4 treatments are: (1) continuous cropping to winter wheat; (2) winter wheat alternating with corn; (3) winter wheat on summer tilled ground; (4) winter wheat on land upon which rye or peas had been plowed under for green manure. Correlating the precipitation, evaporation, and wheat yields with the various treatments, the author concludes that the chief limiting factor in crop production in western Nebraska is insufficient rainfall. Winter wheat, by making its greatest growth during the period of greatest average rainfall and before the time of largest evaporation losses, makes especially economical and efficient use of the moisture available. Lowest average yields per acre, at all stations, were secured from continuous cropping. Yields of wheat following corn have been good at all stations. The highest yields per acre have been those following summer tillage. At 3 of 4 stations less total wheat was produced by summer tilling half of the land than by continuous cropping of all the land to wheat. Allowing for savings in seed and in seeding and harvesting costs from summer tilling, the average profits from summer tilling and continuous cropping to wheat have been about equal. Higher yields of winter wheat per acre have been secured after summer tillage than after corn; but, allowing for the value of the corn produced, the most profitable wheat yields have been those following corn. Averaging the results from all tests at all stations, in comparing the yield of wheat produced after summer tillage with those produced after corn, each additional bushel produced after summer tillage cost an equivalent of 4.9 bushels of corn produced under the corn-wheat rotation.—Plowing under rye or peas for green manure failed to increase average yields over those following summer tillage, and proved to be the least profitable of the methods tested. The average soil moisture content in the spring was greater following summer tillage than following either corn or wheat, and greater following corn than following wheat. This difference is the chief cause of yield divergences in the various methods. In tests of winter wheat varieties at North Platte and Akron, the most promising variety has been Kanred.—T. A. Kiesselbach.

## BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 2067, 2170, 2190, 2287, 2329, 2436, 2514, 2679, 2680, 2681, 2752, 2949, 3040, 3163, 3187)

2204. ANONYMOUS. Bibliographija. [Bibliography.] Želmenija 1: 4. 1921.—This short bibliography of works relating to Lithuanian and English plant names is followed by a list of abbreviations.—C. W. Dodge.

2205. ANONYMOUS. Note. Nature 109: 51. 1922.—Sir David Prain will soon retire from the post of Director of the Royal Botanic Gardens, Kew, which he has held since 1905. From 1884 to 1905 he was curator of the herbarium at Sibpur, Calcutta. He will be succeeded at Kew by Dr. A. W. Hill, assistant director for the last 14 years.—O. A. Stevens.

2206. ANONYMOUS. Obituary. Nature 106: 669. 1921.—This is a brief account of the life of William Harris (1860-1920), who was Government Botanist in Jamaica, where he spent 39 years.—O. A. Stevens.

2207. ANONYMOUS. [Rev. of: COMMITTEE OF THE BRITISH SCIENCE LEAGUE. *A catalogue of British scientific and technical books.* xvii + 376 p. 6 John St., London.] Jour. Botany 60: 58-59. 1922.

2208. ANONYMOUS. [Rev. of: HEDRICK, U. P. *Sturtevant's notes on edible plants.* Rept. New York Agric. Exp. Sta. [Geneva] 1919: 17-686. 1919 (1920). (See Bot. Absts. 8, Entry 862.)] Jour. Botany 60: 91-92. 1922.

2209. ANONYMOUS. [Rev. of: LEE, IDA (MRS. CHARLES BRUCE MARRIOTT). *Captain Bligh's second voyage to the South Sea.* xvi + 290 p., maps and illus. Longmans: London, 1920.] Jour. Botany 60: 22-25. 1922.

2210. BARNHART, JOHN HENDLEY. *Biographical notices of persons mentioned in the Schweinitz-Torrey correspondence* [see Bot. Absts. 11, Entry 2245]. Mem. Torrey Bot. Club 16: 290-300. 1921.—Short biographical sketches of the following are given: William Baldwin (1779-1819), Joseph Barratt (1797-1882), Lewis Caleb Beek (1798-1853), Samuel Elisée von Bridel-Brideri (1761-1828), Samuel Niklas Casström (1763-1827), Zaccheus Collins (1764-1831), Solomon White Conrad (1779-1831), Dennis Cooley (1789-1860), William Cooper (1798-1864), Peter Friedrich Cürrie (1777-1855), William Darlington (1782-1863), Emerson Davis (1798-1866), James Ellsworth DeKay (1792-1851), Alire Raffeneau Delile (1778-1850), Christian Frederick Denko (1775-1838), Chester Dewey (1784-1867), David Bates Douglass (1790-1849), Thomas Drummond (1780-1835), Amos Eaton (1776-1842), James Eights (1788-1882), Stephen Elliott (1771-1830), Eugene Alexander Frueauff (1806-1879), Hezekiah Gates, Benjamin Daniel Greene (1793-1862), Abraham Halsey (1790-1857), Edward Hitchcock (1793-1864), Eli Ives (1779-1861), Edwin James (1797-1861), John Eatton LeConte (1784-1860), Lewis Leconte (1782-1838), Ignaz Ludwig Paul von Lederer (1769-1849), Charles Alexandre LeSueur (1778-1846), William Maclure (1763-1840), Jean Baptiste Ricord-Madianna (1787-1827), André Michaux (1746-1802), François André Michaux (1770-1855), Elisha Mitchell (1793-1857), Gotthilf Henry Ernest Muhlenberg (1753-1815), Thomas Nuttall (1786-1859), William Oakes (1799-1848), James Gates Percival (1795-1856), Perrin, Charles Pickering (1805-1878), Zina Pitcher (1797-1872), William Prince (1766-1842), Frederiek Pursh (1774-1820), Constantine Samuel Rafinesque (1783-1840), Thomas Say (1787-1834), Lewis Saynish, Christian Friedrich Schwägrichen (1775-1853), John Scouler (1804-1871), Benjamin Silliman (1779-1864), Grant Thorburn (1773-1863), Jeremiah van Rensselaer (1793-1831), Jacob van Vleck (1751-1831), William Henry van Vleck (1790-1853), Nathaniel Wallich (1786-1854), Robert Wight (1796-1872).—C. W. Dodge.

2211. BORZA, AL. *Bibliographia botanica Romaniae annorum 1914-1920.* [Botanical bibliography of Roumania for the years 1914-1920.] Bull. Inform. Grad. Bot. si Muz. Bot. Univ. Cluj 1: 41-54. 1921.

2212. BORZA, AL. *Bibliographia botanica Romaniae anni 1921 cum nonnullis additamentis ad bibliographiam annorum 1914-1920.* [Botanical bibliography of Roumania for 1921, with additions to the bibliography for the years 1914-1920.] Bull. Inform. Grad. Bot. si Muz. Bot. Univ. Cluj 1: 87-91. 1921.

2213. [BUTLER, E. J.] *Notices.* Rev. Appl. Mycol. 1: cover p. iii. 1921.—The Review of Applied Mycology is a new abstracting journal appearing monthly since January, 1922. It will form a companion series to Review of Applied Entomology and will cover the general field of plant pathology, exclusive of diseases caused by animals, and of other aspects of applied mycology. The abstracts are sufficiently detailed to enable isolated workers with meagre library facilities to keep informed of the progress of current work.—Subscription price 12 s. per annum from The Editor, Imperial Bureau of Mycology, Kew, Surrey.—D. Reddick.

2214. CALVINO, EVA MAMELI DE. *La mujer en los institutos científicos de Pavia, Italia.* [Women in the scientific institutions of Pavia, Italy.] Rev. Agric. Com. y Trab. [Cuba]

4: 602-604. 6 pl. 1921.—Biographical sketches are presented of the following: Rina Monti, director of the Institute of Zoology; Amalia Coppa, assistant and preparator in the same institution; Eva Mameli de Calvino, assistant professor of the Botanical Institute; Maria Barbaini, assistant preparator in the cryptogamic laboratory of the same institution; Anna Vivanti, technical assistant in the Institute of Comparative Anatomy; Piera Marangoni, assistant in the Institute of General Chemistry; Costanza Baccadora, assistant in the Institute of General Pathology and Histology. Brief mention is made of the following Italian women botanists: Margarita Saluzzo, Cándida Perpentì, Elisabetta Fiorini-Mazzanti, Amalia Moretti Fogia, Maria Antonia Mirabella, Angela Nardo-Cibele, Carolina Corone-de-Berti, Baroness Turco-Lazzari, and Vittoria Altoviti-Avila.—*G. R. Hoerner.*

2215. CATTELL, J. McKEEN, and DEAN R. BRIMHALL. *American men of science, a biographical directory.* 3rd. ed., viii + 808 p. The Science Press: Garrison, New York 1921. \$10.—This volume furnishes a fairly complete list of living American scientists, containing the following information about each of over 9,500 persons: full name with title and mail address, the department of investigation, place and date of birth, education and degrees received, positions held including temporary and minor positions, honorary degrees and other scientific honors, membership in scientific and learned societies, and chief subjects of research. This is followed by a list of American men of science who died between Jan. 1, 1903, and Jan. 1, 1920, giving field of research and dates of birth and death. Finally appears a reprint of CATTELL, J. McKEEN. *Families of American men of science.* Popular Sci. Monthly 86: 505-515. 1915; Sci. Monthly 4: 248-262. 1917; 5: 368-377. 1917, containing much interesting statistical information.—*C. W. Dodge.*

2216. CHAPMAN, A. CHASTON. *The proposed institute of micro-biology.* Nature 108: 425-427. 1921.—The object of such an institute would be to provide for original research with any industry in which micro-organisms or enzymes play an important part; to train workers for such fields; to provide pure cultures for commercial purposes; to serve as a central biochemical library and source of information. The writer thinks it important that this be a separate institute and that this work could be accomplished better by such means than is now done by scattered institutions.—*O. A. Stevens.*

2217. CLAPP, EARLE H., CLYDE LEAVITT, WALTER MULFORD, J. W. TOUMEY, and E. A. ZIEGLER. *North American forest research. Investigative projects in forestry and allied subjects conducted by national, state, and provincial governments, schools of forestry, scientific schools, and private interests in Canada, Newfoundland, and the United States for 1919-1920.* Bull. Nation. Res. Council [U. S. A.] 1: 155-300. 1920.

2218. COBB, RUTH. *Periodical bibliographies and abstracts for the scientific and technological journals of the world.* Bull. Nation. Res. Council [U. S. A.] 1: 131-154. 1920.

2219. CUNDALL, FRANK. *Dr. Anthony Robinson, of Jamaica.* Jour. Botany 60: 49-52. 1922.—These are notes regarding the life and the botanical work of Dr. Anthony Robinson, who died in Jamaica in 1768. [See also Bot. Absts. 11, Entry 2223.]—*Adele Lewis Grant.*

2220. D., W. E. *Earl Jerome Grimes.* William and Mary Lit. Mag. 29: 411-412. 1922.

2221. DAVIS, DONALD W. *Earl Jerome Grimes.* William and Mary Lit. Mag. 29: 314-326. 1922.

2222. DUFOUR, L. *Notice sur Émile Boudier, Président d'honneur de la Société Mycologique de France.* [Note concerning Emile Boudier, honorary president of the Mycological Society of France.] Rev. Gén. Bot. 33: 673-683. Portrait. 1921.—This note of appreciation of the life and work of Emile Boudier includes a discussion of his influence on botany and mycology, and his relations with his students and colleagues.—*J. C. Gilman.*



2223. FAWCETT, W. Dr. Anthony Robinson, of Jamaica. *Jour. Botany* 60: 52. 1922.—The author gives some additional information as to the botanical work and the drawings made by Dr. Robinson. [See also Bot. Absts. 11, Entry 2219.]—*Adele Lewis Grant*.

2224. FULNEK, LEOPOLD, und A. STIFT. Über im Jahre 1920 erschienene bemerkenswerte Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Kartoffelpflanze. [Review of the most important contributions published in 1920 relating to the plant and animal parasites of the potato plant.] *Centralbl. Bakt.* II Abt. 54: 492-529. 1921.

2225. GEROULD, JOHN H. The dawn of the cell theory. *Sci. Monthly* 14: 268-277. 1922.—Quotations from Mirbel and Lamarck definitely establish the fact that they stated the cell theory in 1808 and 1809, 30 years before Schleiden and Schwann.—*L. Pace*.

2226. GRAVES, H. S. Dr. Sargent's contribution to forestry in America. *Amer. Forestry* 27: 684-687. *Portrait*. 1921.

2227. HUCKER, G. J. The bacteriological aspects of cheese ripening. *Absts. Bact.* 5: 287-303. 1921.—This bibliographical review cites 242 titles, and includes a topical index of the bibliography.—*D. Reddick*.

2228. [HUSNOT, T.] L'abbé Auguste Friren. *Rev. Bryologique* 48: 47, 48. 1921.—A short account of the life and botanical activities of Abbé Auguste Friren, for many years connected with the diocesan administration at Metz, is here given. He was born at Thionville in 1837 and died at Metz in 1916. Although interested in the vascular plants he specialized in the bryophytes. His most important publications relate to the bryophytic flora of Lorraine.—*A. W. Evans*.

2229. [HUSNOT, T.] L'abbé Faurie. *Rev. Bryologique* 48: 48. 1921.—The death of Abbé Urbain Faurie, for many years a missionary in Japan, is here announced, although neither the date nor place is indicated. He was an ardent collector of plants in Japan and neighboring countries, giving attention to both phanerogams and cryptogams.—*A. W. Evans*.

2230. HUSNOT, T. L'abbé Hy. *Rev. Bryologique* 48: 46. 1921.—The author reports the death of Abbé [Félix-Charles] Hy in 1918 at Angers, where he had served for many years as professor of botany. He was born at Mouliherne in the department of Maine-et-Loire, but the date of his birth is not given. He published a few articles on bryophytes and also numerous papers on lichens, fungi, Characeae, and phanerogams.—*A. W. Evans*.

2231. [HUSNOT, T.] Robert Braithwaite. *Rev. Bryologique* 48: 48. 1921.—A short note records the death of the British bryologist, Robert Braithwaite, in 1917, at the advanced age of 93 years. The British Moss-Flora is mentioned as his principal work.—*A. W. Evans*.

2232. JACKSON, B. DAYDON. Thomas Nuttall (1786-1859). *Jour. Botany* 60: 57. 1922.—Extracts are given from a letter from Mr. F. R. Dixon-Nuttall regarding the burial place of Thomas Nuttall.—*Adele Lewis Grant*.

2233. J[ATUL, P. A.] Ižanga. [Preface.] *Želmeni ja* 1: 2. 1921.—This is a brief autobiographical note indicating the author's previous botanical ventures and the reasons which led him to undertake the present journal, *Želmeni ja*, with the help of M. J. Shileikis, an artist.—*C. W. Dodge*.

2234. J[ATUL, P. A.] *Želmeni ja*. [Botany.] *Želmeni ja* 1: 18. 1921.—Announcement is made of a new Lithuanian quarterly publication, *Želmeni ja*, to be devoted to general botany. It is published by P. A. Jatul, P. O. box 2128, Boston, Massachusetts.—*J. R. Schramm*.

2235. KEITH, M. HELEN. A bibliography of investigations bearing on the composition and nutritive value of corn and corn products. 178 p. Issued in mimeographed form by the National Research Council: Washington, D. C., 1920. \$2.00.

2236. LENDNER, A. Monsieur Emile Burnat. Bull. Soc. Bot. Genève 12: 137-138. 1920. —This is a brief biography of a Swiss naturalist.—W. H. Emig.

2237. MANCHESTER, H. H. A pictorial history of the garden. I. At the dawn of history. Gard. Mag. 34: 237-240. 8 fig. 1922. II. Transplanting trees three thousand years ago—First attempts at founding a botanic garden—The temple gardens of ancient Egypt. Gard. Mag. 34: 311-314. 3 fig. 1922. III. Running an orchard on shares four thousand years ago—Dining outdoors in ancient Assyria—Flowers that grew in the gardens of Asia Minor. Gard. Mag. 35: 113-115. 5 fig. 1922.

2238. MAZZUCHELLI, ING. Egidio Corti. Rev. Bryologique 48: 46, 47. 1921.—The subject of the present note died at Milan in 1921, at the age of 65. Although an architect by profession he was an accomplished botanist, specializing in the bryophytes, lichens, and algae.—A. W. Evans.

2239. MONTESSUS DE BALLORE, R. de. Index generalis 1920-1921. Annuaire général des universités. [General index 1920-1921. General university year-book.] 1800 p. Gauthier-Villars et Cie: Paris, 1921. 60 fr.

2240. NORTON, J. B. S. What America has done for the dahlia. I. Early days and pioneers. Gard. Mag. 34: 192-194. Fig. 7. 1921.—The author discusses the history of the dahlia in America and mentions persons who have been prominent in the development of this flower.—H. C. Thompson.

2241. OBERLY, EUNICE R., and JESSIE M. ALLEN. A check list of the publications on the subject of plant pathology issued by the state agricultural experiment stations 1878-1920. U. S. Dept. Agric. Library Bibliogr. Contrib. 2. 179 p. 1922.

2242. RECORD, SAMUEL J. Bibliography of the woods of the world (exclusive of the temperate region of North America) with emphasis on tropical woods. Mimeograph edition, 28 p. New Haven, Connecticut. 1922.

2243. ROGERS, L. A. Preliminary statement of a project for a laboratory for research in abstract bacteriology. [Abstract.] Absts. Bact. 5: 1-2. 1921.

2244. SCHONLAND, S. W. Tyson F. L. S. Ann. Bolus Herb. 3: 120-121. 1 pl. 1921.—This is a short sketch of the life of W. Tyson (1851-1920), who was one of the most indefatigable of recent botanical collectors in South Africa.—E. M. Doidge.

2245. SHEAR, C. L., and NEIL E. STEVENS. The correspondence of Schweinitz and Torrey. Mem. Torrey Bot. Club 16: 119-289. Pl. 6-7, fig. 1-3. 1921.—Comparatively few of the letters written between Dec. 29, 1819, and Nov. 2, 1833, are missing, 71 being printed here. Long lists of specimens and desiderata are omitted. Of contemporary articles and longer works 94 are mentioned, the complete citations of which form an appendix compiled by FLORENCE P. SMITH. Besides many casual references to plants, members of the following genera are discussed more fully, either as to synonymy or morphology: *Craterium*, *Gyropodium*, *Isaria*, *Phallus*, *Rhizomorpha*, *Sclerotium*, *Thelephora*, *Borreria*, *Cenomyce*, *Evernia*, *Pyrenula*, *Thelotrema*; *Blasia*, *Blandfordia*, *Jungermannia*; *Andraea*, *Anocetangium*, *Gymnostomium*, *Grimmia*, *Hypnum*, *Leskea*, *Leucodon*, *Orthotrichum*, *Schistidium*, *Splachnum*; *Woodisia*; *Andropogon*, *Bromus*, *Callitriche*, *Campanula*, *Carex*, *Ceanothus*, *Cerastium*, *Circaea*, *Convolvulus*, *Cyperus*, *Galium*, *Gerardia*, *Gratiola*, *Heuchera*, *Houstonia*, *Impatiens*, *Iris*, *Lithosper-*

*mum*, *Lycopus*, *Lysimachia*, *Lythrum*, *Neottia*, *Oxalis*, *Pleuraphis Jamesii* with figure, *Poa-mogeton*, *Scirpus*, *Sesbania*, *Seymeria*, *Trigonella*, *Veronica*, *Viola*, *Xyris*. Some biographical material is given regarding many contemporary botanists [see Bot. Absts. 11, Entry 2210].—*C. W. Dodge*.

2246. STIFT, A. Über im Jahre 1920 veröffentlichte bemerkenswerte Arbeiten und Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Zuckerrübe. [The most important contributions in the field of animal and plant parasites of the sugar beet.] Centralbl. Bakt. II Abt. 54: 261-272. 1921.

2247. TUCKER, ETHELYN M. Bibliographical notes. Jour. Arnold Arboretum 2: 236-239. 1921 [1922].—The dates of publication of the 20 parts of Hempel und Wilhelm, Bäume und Sträucher des Waldes, 1889-1899, and of the 30 fascicles of Siebold, P. F. von, Flora Japonica, 1835-1870, are given.—*Alfred Rehder*.

2248. TUTTLE, P. V. Notes on ancient medicine. Western Druggist 43: 12, 20-24. 1921.—A brief survey of the early history of medicine and surgery, and some interesting notes regarding the identity of drugs used by the ancients, comprise this article.—*C. M. Sterling*.

2249. W., G. H. Virgil's botany. [Rev. of: SARGEANT, JOHN. The trees, shrubs and plants of Virgil. vii + 149 p. B. H. Blackwell: Oxford, 1920.] Nature 106: 825-826. 1921.

2250. WATTS, W. W. World list of scientific publications. Nature 108: 531. 1921.—This is a proposal to publish an octavo volume to furnish: (1) as complete a list as possible, (2) names of libraries having the publications on file, (3) basis for cooperation between libraries, and (4) library catalog. the compilation to be undertaken by the staff of the British Museum. Price 2£. 2s.—*O. A. Stevens*.

2251. WEATHERBY, C. A. Barratt, Torrey and Schweinitz: a correction and a discrepancy. Rhodora 23: 300-301. 1921.—These are notes supplementary to the author's Old-time Connecticut Botanists and Their Herbaria [see Bot. Absts. 10, Entry 1586].—*M. L. Fernald*.

2252. WHITE, JAS. W. Cedric Bucknall. Jour. Botany 60: 65-67. Portrait. 1922.—This is a short biographical sketch of Cedric Bucknall, who died in December, 1921.—*Adèle Lewis Grant*.

## BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 2332, 2510, 2566, 2994, 2997, 3000)

2253. ANONYMOUS. Science in secondary schools. Nature 109: 56-57. 1922.—This is a report of the Science Masters' meeting recently held at the Royal College of Science. Discussions will be reported in School Science Review.—*O. A. Stevens*.

2254. ALEXANDER, W. P. A nature-study paradise in western New York. Nat. Study Rev. 17: 349-354. 1921.—This is a brief account of a new state park containing much wild mountainous country.—*W. L. Eikenberry*.

2255. FARR, CLIFFORD H. Plant life and human affairs. School Sci. and Math. 21: 847-855. 1921.—The author summarizes the important relationships of botany to man's life and indicates the future increasing importance of plant study.—*W. L. Eikenberry*.

2256. GATES, R. R. [Rev. of: GAGER, C. STUART. *Heredity and evolution in plants.* ix + 266 p. P. Blakiston's Son and Co.: Philadelphia, 1920.] *Nature* 106: 723. 1921.

2257. HASTINGS, G. T. A high-school flower show. *Torrey* 21: 101. 1921.—On Sept. 30 and Oct. 1 and 2, 1921, the high schools of New York City held a flower show at the American Museum of Natural History, in charge of the Biology Teachers' Association. It is considered to have been of sufficient value to warrant making it an annual event.—J. C. Nelson.

2258. HOLMQUIST, A. M. The biological sciences in Minnesota high schools. *School Sci. and Math.* 22: 166-174. 1922.—This survey of the present situation includes data and a defense of biological study.—W. L. Eikenberry.

2259. HUNTER, G. W. An experiment in the use of three different methods of teaching in the classroom. *School Sci. and Math.* 21: 875-890. 1921; 22: 20-32. 1922.—The 3 methods concerned are the textbook method, the lecture method, and the developmental method. The results were favorable to the developmental method, though the author thinks the experiments were not extensive enough to justify a rigid conclusion.—This is an example of the attempt to use biological methods in elucidating the problems of biology teaching.—W. L. Eikenberry.

2260. KARSTEN, G. Asiatische Epiphyten. In KARSTEN, G., und H. SCHENCK. *Vegetationsbilder.* 14 Reihe, Heft 1. Gustav Fischer: Jena, 1921. 30 marks.

2261. SMALL, J. A textbook of botany. 8vo., 692 p. J. & A. Churchill: London, 1921. 25 s.

## CYTOLOGY

G. M. SMITH, *Editor*

(See also in this issue Entries 2456, 2477, 2478, 2479, 2480, 2482, 2483, 2744, 3018, 3091, 3101)

2262. BELLING, JOHN. The behavior of homologous chromosomes in a triploid *Canna*. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 197-201. 2 fig. 1921.—The author counted the chromosomes in pollen mother cells of 31 species and clones of *Canna*. Of these forms, 22 clones formed 9 heterotypic bivalents, which separated to form 9 + 9 single chromosomes; 3 clones had the same total number of somatic chromosomes (18), but the reduced numbers from each mother cell were usually unequal; 5 clones showed an irregular heterotypic division, the total number of daughter chromosomes being 24 to 26; and 1 clone regularly showed 9 triads and 27 daughter chromosomes. In the last case, counts tended to show that each triad gave a random distribution of its 2 + 1 daughter chromosomes to the daughter nuclei with about half the pollen grains empty. This form resembled the diploid forms in size of plant and flower, while others with more than 18 chromosomes were larger. A triploid *Datura* also formed triads with random segregation.—Howard B. Frost.

2263. CHODAT, R. Le mecanisme de la division cellulaire. *Bull. Soc. Bot. Genève* 12: 130-131. 1920.—This is an announcement of a paper to be published in the following issue of the bulletin.—W. H. Emig.

2264. DANGEARD, P. A. La structure de la cellule végétale dans ses rapports avec la théorie du chondriome. [The structure of the vegetable cell in relation to the theory of chondriosomes.] *Compt. Rend. Acad. Sci. Paris* 173: 120-123. 1921.—This is a brief historical résumé of the study of mitochondria in plants and animals, with a statement of the author's interpretation. It is held that the cytoplasm is not a homogeneous substance made up of bodies more recently called mitochondria, but first referred to by Altmann as granules. Dangeard holds that the mitochondria make up at least 3 different systems: the vacuome, formed by the metachromes and ordinary vacuoles and finally giving rise to anthocyanins and

tannins; the plastidome, consisting of the various plastids and the mitochondria from which they arise; and the spherome, composed of numerous refractive fat-forming bodies called microsomes. It is pointed out that in animals the mitochondria may play quite different roles, such as being related to fibrillar structure and activity.—*C. H. and W. K. Farr.*

2265. DERSHAU, M. VON. Pflanzische Plasmastrukturen und ihre Beziehungen zum Zellkern. [Plant plasma-structures and their relations to the nucleus.] *Flora* 113: 199-212. Pl. 8-9. 1920.—The idea of the participation of nuclear material in cytoplasmic processes has been obscured by the conception of the existence of a firm nuclear membrane and the "Kinoplasmatheorie." An effort was made to determine whether the fibrillar structures of Némec have an intimate connection with the nucleus or whether the kinoplasmic threads described by Lindforss and Å. Åckerman are derivatives of the nucleus.—The nucleus in the living cell is surrounded by a clear refractive area into which extend conical projections from the nucleus. Both this area and the projections are destroyed by the ordinary fixing fluids, but preserved by fixing in 70 per cent alcohol. Similar processes were found on the nucleole. At the apex of the projections from the nucleus is found a basichromatic droplet. From such projections beaded threads, extending to the plasma membrane, connect, by plasmodesmen, with similar threads from neighboring cells. These threads at times traverse the nucleus, uniting with it by means of the nuclear processes. The fibrillae consist of a plasmatic ground-substance with nuclein more or less sheathing it. They may serve as a line of conveyance for nutritive substances; this does not preclude an irritable function also. The author confirms earlier investigators in demonstrating the interconnection of nucleus, chloroplast, and pyrenoid in the Chlorophyceae.—The epidermis of a leaf was examined in a cold room, where the nuclear projections were recognized. When transferred to a warm room the process, after about 1 minute, became a thin plasma thread which traversed a vacuole and joined with the plasma membrane. The basichromatic end-droplets of the processes gradually disappear with the building up of the fibrillae, to whose formation they may contribute. The character of the nucleus with distinct processes was observed also in the early and late mitotic phases. The kinoplasmic felt-work which gives rise to the multipolar spindle is, because of these processes, to be considered as of nuclear or even nucleolar origin. The fibers connecting the telophase nuclei have the same relation to the nucleus. Plants especially studied for the observation of these phenomena were: *Pisum sativum*, *Vicia faba*, *Iris germanica*, *Allium cepa*, *Fritillaria imperialis*, *Lilium martagon*, *Tulipa Gesneriana*, *Zea mays*, *Anemone nemerosa*, and *Tradescantia virginica*.—*Wm. Randolph Taylor.*

2266. GILLIS, J. Over Zetmeel en Zijn optische eigenschappen. [Concerning starch and its optical properties.] *Naturwetenschapp. Tijdschr.* 3: 126-131. 1921.—The author, discussing the optical properties of the starch grain, shows that the notion of a hilum at either end of an optical axis as held by Reehlyer [see Bot. Absts. 11, Entry 2278] is untenable.—*C. D. La Rue.*

2267. GOODSPEED, T. H., and M. P. CRANE. Chromosome number in the Sequoias. *Bot. Gaz.* 69: 348-349. 1920.—This is a note questioning Lawson's statement that there are 16 chromosomes in the gametophyte and 32 in the sporophyte of *Sequoia sempervirens*. The authors find the numbers in *S. gigantea* to be respectively 12 and 24, and they think that the same numbers probably obtain for *S. sempervirens*.—*H. C. Cowles.*

2268. GUILLIERMOND, A. Observations cytologiques sur le bourgeon d'*Elodea canadensis*. [Cytological observations on the bud of *Elodea canadensis*.] *Compt. Rend. Acad. Sci. Paris* 173: 331-333. 1921.—The vegetative growing point and the young leaves appear lacking in chlorophyll. In the living condition, small lipid grains corresponding to the spherome of Dangard may be seen. In development of the leaf chondriocents are transformed into chloroplasts of the plastidome. In addition there are mitochondria not related to plastid formation, and also an extensive vacuolar system.—*C. H. Farr.*

2269. KEILIN, D. On the occurrence of a supplementary chromatic body in *Maupasella nova Céptède* (Ciliata astoma), an intestinal parasite of earth-worms (*Allolobophora caliginosa*

Savigny). *Parasitology* 12: 92-94. *Pl. 6.* 1920.—In many specimens of *Maupasella nova* obtained from the alimentary canal of *Allolobophora caliginosa* Sav., collected near Paris, the author found a ribbon-like supplementary chromatic body. Although present in abundance the author was unable to trace the origin of the chromatic body. Several possible explanations are discussed. This supplementary chromatic body has not been described in other ciliates. The most peculiar thing about it is that those found in different specimens of *Maupasella* are apparently not related to one another, but are formed independently in each ciliate which possesses them.—C. D. Sherbakoff.

2270. KOZŁOWSKI, ANTOINE. Sur l'origine des oleuleucites chez les hepatices à feuilles. [On the origin of elaioplasts in the leafy liverworts.] *Compt. Rend. Acad. Sci. Paris* 173: 497-499. *Fig. 1-6.* 1921.—It has been shown that chloroplasts, chromoplasts, and leucoplasts are formed by the agglomeration of small droplets of suspended particles in the cytoplasm. The author shows that the oil plastids in the leaves of liverworts (*Lophocolea heterophylla*, *L. bidentata*, *Lepidozia reptans*, and *Mastigobryum trilobatum*) are formed in the same way. From 3 to 28 elaioplasts are found in each cell. They are formed near the chloroplasts and frequently approach the latter in size. It is believed that the substance of which the elaioplasts are composed is formed in the chloroplasts.—C. H. Farr.

2271. LITARDIÈRE, R. DE. Recherches sur l'élément chromosomique dans la caryocinèse somatique des Filicinaées. [Researches on the chromosome in somatic mitosis in Filicineae.] *La Cellule* 31: 255-473. *Pl. 1-9, 2 fig.* 1921.—In this detailed study of the behavior of the chromosomes in somatic mitosis in more than 60 species, representing all but 1 of the families of Filicineae, the author finds that the telophasic transformation of the chromosomes (catachromasis) occurs in 4 general modes, each being accompanied by a corresponding mode of prophase transformation (anachromasis). These modes, which are not sharply distinct types and are in no way correlated with taxonomic position, are as follows: (1) Chromosomes large. In telophase the chromosomes become alveolized and connected by anastomoses to form the interphasic reticulum. In prophase the reticulum breaks up into its constituent alveolar-reticulate chromosomes; in each of them the more delicate parts break down, leaving a simple zigzag thread in which, after equalization, the longitudinal split develops. The double chromosomes then shorten and thicken. This mode is found in most Hymenophyllaceae and in *Osmunda*. (2) Chromosomes slender. In telophase there is no alveolation, the chromosomes being drawn out to filaments connected by anastomoses and forming a reticulum often resembling that in mode 1. In prophase the anastomoses are retracted and the chromosomes concentrate directly into slender crooked threads which split and then thicken. *Pteris cretica* and a large number of other species from various families conform to this type. (3) Chromosomes fairly slender. Behavior intermediate between modes 1 and 2. In telophase some chromosomes show narrow alveoles, while others remain unalveolized as simple filaments. All are connected by anastomoses to form the reticulum. In prophase each chromosome becomes an irregular simple thread, the alveolized ones indirectly as in mode 1 and the unalveolized ones directly as in mode 2. The split develops in the simple threads, but it may be obscured in the thick threads of the later prophase and not reappear until metaphase. This mode is found in *Blechnum occidentale*, *Trichomanes*, *Marattia*, and other forms. (4) Chromosomes very small, appearing as round or ovoid bodies, undergoing no transformation other than anastomosis during telophase, and remaining clearly visible in interphase. In prophase the anastomoses disappear; the chromosomes then elongate slightly, split, and again shorten. This mode is observed in *Azolla* and *Salvinia*.—The author gives a list of chromosome numbers reported by others for Filicineae, and also a list of the approximate diploid numbers in 35 species or varieties determined by himself. Most of the numbers are very high, making exact counts difficult or impossible. The facts do not yet warrant any general statement regarding the bearing of chromosome number on phylogenetic relationships within the Filicineae, but it is evident that chromosome number must be considered in separating species and varieties. *Salvinia natans* apparently has 3 races, with 8, 16, and 48 chromosomes. In many if not all fern species the chromosomes of the complement differ in length, but all members of the comple-

ment cannot be accurately measured. Although the thickness of the chromosome may vary considerably in different races and species and only slightly at a given stage in a given race, differences in thickness are not significant as regards broader phylogenetic relationships. Nothing which can be safely interpreted as somatic chromosome pairing is observed in the species studied.—In an extensive comparison of his results with those of other cytologists the author emphasizes the following points. The chromosomes maintain their individuality through all stages of the nuclear cycle: examination of both living and fixed material shows that they have a definitely organized reticulate structure in interphase and that adequate fixation (Benda) does not create this structure but only renders it more visible by modifying refringency. The reticulum consists not of 2 morphologically distinct elements, but of an achromatic substratum impregnated by a more fluid chromatic substance. The telophasic alveolation does not represent a splitting, since each alveolized chromosome gives rise in prophase to a simple thread which splits: splitting in somatic mitosis is prophasic no matter what mode of catachromasis occurs, and the lengthening at this stage is related to the equational character of the division. Splitting does not involve a division of autonomous chromomeres; in fact no evidence of the existence of such units is found in ferns. Alveolation is not due to an imbibition of karyolymph, but to an internal redistribution of the chromosome substance. It is not to be interpreted as a resolution of the chromosomes into granules: "granules" are only the thicker parts of a continuous reticulum. Nor does it represent a "spiralization" of the chromosome, though fragments of spirals often occur as the result of the arrangement of the alveoles. Bolles Lee's theory of the structure and transverse division of chromosomes is rejected. There is no continuous spireme at either prophase or telophase.—The karyolymph does not arise from the chromosomic alveoles, but probably from the karyolymph of the mother nucleus; it occupies the spindle region during anaphase and moves in between the chromosomes after the "tassement polaire" stage, new fluid later being added by the cytoplasm. The nuclear membrane, which becomes very resistant, arises primarily as a condensation of the cytoplasm. The nucleolus has a genetic relation of some sort with the chromosomes, probably arising from a substance which is derived from the chromosomes in telophase and largely transferred to them in late prophase. In nuclei of the small chromosome type there is an inverse relation between the chromaticity of the reticulum and the volume of the nucleolar mass.—*L. W. Sharp.*

2272. NORDENSKIÖLD, E. *Spermatogenesis in Ixodes ricinus Linn.* Parasitology 12: 159-166. Pl. 11. 1920.—The author states that it has long been known that ticks possess spermatozoa differing considerably from the typical flagellate form. He makes several corrections in his previous communications on the subject. The earlier results were obtained chiefly from material fixed in Carnoy's alcohol-chloroform-acetic acid mixture, while those described in the present paper were obtained mainly from material fixed in Flemming's chromic-osmic-acetic acid mixture. The paper consists mainly of descriptions of the changes in the spermatid during its development.—*C. V. Sherbakoff.*

2273. POLITIS, JEAN. *Du rôle du chondriome dans la défense des organismes végétaux contre l'invasion du parasitisme.* [The role of the chondriosome in the defense of plants against invasion by parasites.] *Compt. Rend. Acad. Sci. Paris* 173: 421-423. 1921.—In a study of the effect of *Oidium Evonymi-japonici* on the leaves of *Evonymus*, it is found that parasitic stimulation produces a reaction in the mitochondria. These mitochondria are the centers of elaboration of such substances as chlorophyll, anthocyan, and tannins. The last named are formed in large quantities under parasitic conditions and probably have a defensive function against the parasite. The reaction of mitochondria in different plants and in the same plant depends upon the degree of development and the nature of the parasite.—*W. K. Farr.*

2274. POLITIS, JEAN. *Du rôle du chondriome dans la formation des essences dans les plantes.* [On the role of the chondriome in the formation of the volatile substances of plants.] *Compt. Rend. Acad. Sci. Paris* 173: 98-100. 1921.—Numerous elongated chondriocentes were

found in developing cells of the glandular trichomes of *Pelargonium odoratissimum* and certain of the Labiates, such as *Mentha piperita*, *M. pulgeoides*, *Rosmarinus officinalis*, *Thymus vulgaris*. Their presence is correlated with that of tannin compounds.—C. H. Farr.

2275. POTTIER, JACQUES. Observations sur les masses chromatiques du cytoplasme de l'oosphère chez *Mnium undulatum* Weis et *Mnium punctatum* Hedwig. [Observations on the masses of chromatin in the cytoplasm of the oosphere of *Mnium undulatum* and *M. punctatum*.] Compt. Rend. Acad. Sci. Paris 173: 445-448. Fig. 1-15, a-f. 1921.—Masses of extruded chromatin, 1-4 in number, were observed in the cytoplasm of the oospheres of the 2 species. The chromatic masses in both species are often surrounded by a clear zone.—W. K. Farr.

2276. POTTIER, JACQUES. Observations sur les masses chromatiques des noyaux et du cytoplasme des cellules du canal et de la paroi du col de archégone chez *Mnium undulatum* Weis. [Observations on chromatic masses of the nucleus and cytoplasm of the canal cells and neck wall cells of the archegonium of *Mnium undulatum*.] Compt. Rend. Acad. Sci. Paris 173: 463-466. Fig. A-R. 1921.—A study of the material used to show the extrusion of chromatin by the nuclei of the oospheres in *Mnium undulatum* reveals the presence of extruded chromatin in neck canal cells. The peripheral cells of the neck have masses of chromatin which, although bi-lobed and tri-lobed, are rarely completely divided. The extrusion of these latter masses is doubtful.—W. K. Farr.

2277. PRATNE, A. Die Chemie des Zellkernes. [The chemistry of the nucleus.] 29 p. Breslau, 1920.

2278. REYCHLER, A. Over aardappelzetmeel. [Concerning potato starch.] Naturwetenschapp. Tijdschr. 2: 9-12. 1920.—In this discussion of the structure of the grain of potato starch, the author states that there is a hilum on either side, one at each end of an optical axis. [See also Bot. Absts. 11, Entry 2266].—C. D. La Rue.

2279. SPEK, J. Experimentelle Beiträge zur Kolloidchemie der Zellteilung. [Experimental studies on the colloid chemistry of cell division.] 91 p. Heidelberg, 1920.

2280. WISSELINGH, C. VAN. Zehnter Beitrag zur Kenntnis der Karyokinese. [Tenth contribution to the knowledge of karyokinesis.] Beih. Bot. Centralbl. Abt. 1. 38: 273-354. 108 fig. 1921.—The paper is organized under 3 heads: (1) new investigations of karyokinesis in *Spirogyra*; (2) methods for the investigation of nuclei and nuclear figures; (3) the present state of our knowledge of the nucleus and nuclear division in *Spirogyra*.—*Spirogyra condensata* (Vauch.) Kütz and *S. dubia* Kütz, 2 slender species, were used. Earlier papers were based on thicker (broader) species.—In the resting nucleus the chromatin forms a network with thicker knots connected by fine threads. The nucleole is spherical and probably has a membrane. With a magnification of 2,000, after treatment with chromic acid solution and staining with Bayer's blue (extra greenish), the structure becomes visible, a network with thicker parts and fine threads.—In prophase the nucleole disappears except for 2 small bodies. In the early prophase 2, sometimes several, small bead-like chains appear. Later stages show 2 shorter thicker threads of equal size. In metaphase the spindle develops, the nuclear membrane disappears, the nuclear reticulum forms the equatorial plate of a number of short threads or chromosomes, and only the 2 nucleolar threads remain as entities distinct from the nucleole. These are usually found on the outer edge of the equatorial plate, and are larger and more deeply stained than the chromosomes. The equatorial plate divides into halves. The chromosomes and the nucleolar threads divide lengthwise, as is evident in the anaphase. In the telophase the nuclear threads broaden and develop into a network as in the resting nucleus.—The nucleolar threads show the same evidences of individuality as to the chromosomes. In the 2nd species only 1 long thread develops in the nucleole, which divides into 11 short ones. These split on the equatorial plate and later again form 1 thread.—The study was made on material as follows: (1) living material; (2) stained serial sections; (3) material treated by the



chromic acid method; (4) material treated with chemicals, and material cooled, centrifuged, or anaesthetized, etc. For the chromic acid method the material is fixed in Flemming's solution and investigated while in a water solution of chromic acid, usually 25 per cent, but as strong as 50 per cent is sometimes used. Staining in Bayer's Blue (extra greenish) often brings out structures very distinctly.—A full discussion of the present knowledge of nuclear division in *Spirogyra* is given. The question of chromosomes as heredity bearers is discussed with the conclusion that since protoplasm, nucleus, and chromatophore each develops from its like, all could furnish hereditary characters.—*L. Pace*.

## ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 2078, 2081, 2100, 2117, 2132, 2260, 2340, 2395, 2405, 2409, 2411, 2427, 2464, 2514, 2546, 2594, 2626, 2633, 2635, 2643, 2644, 2645, 2652, 2654, 2658, 2660, 2662, 2663, 2665, 2668, 2669, 2670, 2671, 2673, 2722, 2750, 2987, 3000, 3013, 3019, 3144, 3163, 3170, 3171, 3179, 3190, 3191, 3192, 3194, 3195, 3196, 3198, 3201, 3207, 3214, 3229, 3230, 3231, 3236, 3242, 3258)

### GENERAL, FACTORS, MEASUREMENTS

2281. BEWS, J. W. The Mont-aux-Sources National Park. Notes on its vegetation. Jour. Bot. Soc. South Africa 6: 11-13. 1920.

2282. HOWARTH, W. O. Notes on the habitats and the ecological characters of three subvarieties of *Festuca rubra* L. Jour. Ecol. 8: 216-231. 6 fig. 1920.—The critical studies of these grasses include not only taxonomic distinctions but anatomical and ecological examination. Subvariety *grandiflora* is a mesophyte in habitat and in structure, found growing on fertile, humid, well aerated calcareous soils, and has dark green glabrous leaves. Subvariety *tenuifolia* shows xeromorphic structures and is found dominantly (1) in salt marshes, (2) on pebble ridges, (3) on exposed rocks of the sea-coast in scanty soil, and (4) on the calcareous tufa on the cliff face. Its foliage tends to be yellowish green. The 3rd subvariety, *glaucescens*, is allied to the 2nd and resembles it in structure and habitat. It grows in the higher zones of the salt marsh and is more definitely yellow-green in color.—*Geo. D. Fuller*.

2283. OSBON, C. C. Classification and formation of peat and related deposits. Jour. Amer. Peat Soc. 14: 37-44. 1921.—Peat is the partly carbonized organic residuum produced by an arrest of the decomposition of roots, twigs, seeds, shrubs, mosses and other vegetation covered or saturated with water. Muck is soil containing a high percentage of uncarbonized organic matter. A bog is a flat or gently sloping wet area devoid of trees, except in some instances small scattered patches of tamarack or black spruce, and overgrown principally by Sphagnum moss and heath shrubs, or by grasses and sedges. A marsh is an open shallow basin or relatively flat area covered with water, devoid of trees and overgrown by grasses, sedges, cattails, bulrushes, or reeds. The chief difference between bogs and marshes lies in the character of the living vegetation and the quantity of surface water. A swamp is distinguished from both by being overgrown by trees. There are 2 types of bogs on the basis of topography—the filled basin type and the built-up type.—*G. B. Rigg*.

2284. PILlichODY, A. von. Von Spät- und Frühfrösten und über Frostlöcher. [Late and early frosts and frostpockets.] Schweiz. Zeitschr. Forstw. 72: 33-40. 2 pl. 1921.—In the higher elevations of Switzerland, at about 1,000 m., frosts occur through May and some in June. July is usually free from frosts. The fall frosts begin in August. Such conditions are unfavorable to tree growth and also limit the region to exceptionally hardy species. Frost pockets occur in unexpected places due to air drainage. Usually they are almost entirely inclosed and are not covered with tree growth. Spruce persists in some places, but its form is stunted and only a few small needles are borne on each twig.—Records of temperature showed

a difference of 5-11°C. in March, 1-9 in May, and 5-8 in June between the frost pocket and adjacent timber, with the colder temperatures in the frost pockets. Other months show similar variations.—*J. V. Hofmann.*

2285. RICHARDSON, W. D. **The ash of dune plants.** *Science* 51: 546-551. 1920.—Physical and chemical analyses of the sand are given, and show that 90-92 per cent is silica. The remaining 8-10 per cent is undecomposed silicate minerals. The sand is composed of clear white, yellow, and red sand quartz grains and a considerable proportion of highly colored and dark particles. From these last named particles dune plants must, in the main, derive their supply of soluble inorganic nutrient substances. The root systems are well equipped to search the sand for mineral food since they are of relatively large dimension, often greatly exceeding in length the height of the plant. Analyses of ash constituents of several typical species are given. Comparisons of the ash are made with that of like plants growing on normal soil. It is found that the dune plants have obtained and concentrated in their tissues the same mineral constituents commonly found in plants growing in good soils, and these have been accumulated in approximately the same relative proportions. From most inadequate and insufficient sources the dune plants have obtained their requirements of elements such as iron, potassium, calcium, phosphorus, and sulphur, which are assumed to function in metabolism. Other elements, such as silicon, chlorine, sodium, and aluminium are also present in dune plants, although, with the exception of silicon, in small proportion.—*A. H. Chivers.*

2286. SALISBURY, E. J. **Soil reaction.** *Jour. Ecol.* 8: 239. 1920.—This is a review of several papers in volumes 8 and 9 of *Soil Science* which seem to show that the soil reaction may have an appreciable effect upon the acidity of plant juices. This may influence the plant directly or indirectly through the agency of mycorrhiza or symbiotic bacteria.—*Geo. D. Fuller.*

2287. SALISBURY, E. J. **The significance of the calcicolous habit.** *Jour. Ecol.* 8: 202-215. 1920.—In a general discussion of calcicoles it is pointed out that this group of plants is composed of species which find a suitable home on calcareous soils without necessarily implying any obligatory association with, or even preference for, such soils apart from that imposed by climate or biotic factors. Such plants at the limits of their ranges tend to show more decided edaphic limits and it is suggested that calcicole species probably belong to 2 classes, of which one is more responsive to physical features usually associated with calcareous soils, while the other is more sensitive to chemical differences. The complexity of the problem is indicated by drawing attention to the comparative freedom of calcareous soils from toxic products of decay, their usually low water-holding capacity, the more abundant development of soil fauna, and the influence of calcium upon the absorption of other elements such as potassium. There is need of much more accurate data regarding distribution and especially with regard to the actual physical and chemical condition of soils classed as calcareous. It is pointed out that the occurrence of calcifuge species on calcareous soils is at times to be explained by the leaching of the surface layers thus providing a non-calcareous substratum for the development of the early (and critical) stages of the silicicole. A rather extensive bibliography is given.—*Geo. D. Fuller.*

2288. SETCHELL, W. A. **The temperature interval in the geographical distribution of marine algae.** *Science* 52: 188-190. 1920.—The activities controlled are undoubtedly all the necessarily vital activities of the organism, but it is fairly certain that those subject to the special control of the limited temperature interval are those more or less connected with reproduction. In general the reproductive activities are carried on at the maxima of the temperatures at which the plant is actively and normally performing any of its vital functions. The initial temperatures are undoubtedly lower, as are also those of most rapid growth and those of most active metabolism. Probably the optima of effective reproduction which makes for persistence in distribution lie within the surprisingly narrow interval of 5°C. The overwhelming majority of the known marine algae are recorded from 1 zone only. The invasion of other zones than the normal is due to the existence in the invaded zone of tem-

peratures of the intensity duration found in the normal zone. Another interval which has to do with the life in any zone is the interval of amplitude of seasonal variation in temperature. The extreme interval is 10°C. in amplitude. Where the seasonal interval is large the species pass the colder portion of the season in a quiescent state; *Ascophyllum nodosum* is cited as an example. The 10, 15, 20 and 25°C. isotherms of the surface waters sharply mark off the life zones from one another, as shown by a careful study in the region of Vineyard Sound. The explanation of the narrowness of the temperature interval which is of such influence in controlling distribution is at present not clear.—A. H. Chivers.

2289. TAYLOR, ARAVILLA MEEK. Occurrence of *Funaria hygrometrica* (L.) Sibth. Bryologist 24: 7-8. 1921.—*Funaria hygrometrica* is a cosmopolitan species which appears to be a pioneer in many ecologic habitats, such as rock crevices, sandy city lots, burnt ground (here often preceded or accompanied by *Marchantia*), and cinder piles. Its abundance and wide distribution seem due to its being equally adapted to acid or basic soils, not especially dependent on moisture, and to its being an annual species of rapid growth which matures abundant spores early in the season.—E. B. Chamberlain.

2290. WHERRY, EDGAR T. The soil reactions of the ferns of woods and swamps. Amer. Fern Jour. 11: 5-16. 1921.—The author gives a table of classification, based on soil reaction, of 35 species of ferns, 5 of which are intensely acid, 5 acid, 18 indifferent, and 7 calcareous. This is followed by a discussion of the features of the individual species.—F. C. Anderson.

2291. WRIGHT, A. H. The vertebrates of the Otter Lake Region, Dorset, Ontario. 1. General account. Canadian Field Nat. 34: 141-142. 1920.—This is one of a series of short papers treating in a general way the plants and animals of the Otter Lake Region. The introduction includes a few ecological observations.—W. H. Emig.

#### STRUCTURE, BEHAVIOR

2292. BENNETT, A. G. On the occurrence of diatoms on the skin of whales. Proc. Roy. Soc. London B 91: 352-357. Fig. 1-2. 1920.—Blue whales (*Balaenoptera musculus*) and fin whales (*B. physalus*) taken at South Shetlands and South Orkneys show a buff coating due to almost pure cultures of *Cocconeis ceticola* Nels. n. sp. Blue whales with this coating are known as "sulphur-bottoms." The same color is noted on antarctic icebergs. Clean skinned whales are poor in oil and are believed to be new arrivals from warmer waters. It is believed that the skin flora of whales will be of great assistance in tracing migrations. A systematic note on the diatom material, by E. W. Nelson, is appended.—Paul B. Sears.

2293. BEQUAERT, J. On the dispersal by flies of the spores of certain mosses of the family Splachnaceae. Bryologist 24: 1-4. 1921.—The author observed small flies of the genus *Phorbia* visiting the capsules of 2 species of *Tetraplodon* and licking up the moisture, or secretion, from the stomata. The flies appear always to alight at the mouth of the capsule and then crawl downward, thus coming in contact with the masses of sticky spores forced out by the contraction of the hygroscopic capsule. These flies also frequent animal excreta and decaying organic matter upon which substrata the mosses in question always grow. The flies are apparently attracted to the capsules by the strong odor. A résumé of European observations bearing on the subject is given.—E. B. Chamberlain.

2294. BONNIER, GASTON. The production of honey by bees. Sugar 21: 406-409. 1919.—The production of nectar in flowers is discussed.—C. W. Edgerton.

2295. CANNON, W. A., and E. E. FREE. Soil aeration and growth of roots. [Abstract.] Ecology 1: 64. 1920.

2296. CUTTING, E. M. On the pollination mechanism of *Incarvillea Delavayi*, Frank. Ann. Botany 35: 63-72. 3 fig. 1921.—Each of the 4 anthers has 2 stiff, downwardly projecting prongs, 1 for each lobe. Manipulation of these prongs is followed by the opening of the anther lobes and the discharge of pollen. They are so arranged that 1 lobe of each anther discharges some of its pollen as the insect enters the flower and the other lobe is emptied as the insect comes out. The pollen is characterized by the presence of surface slits. The high osmotic pressure of the contents and the approximation of the walls of the slits on drying are regarded as adaptations to prevent too great loss of water.—W. P. Thompson.

2297. DANIEL, LUCIEN. Recherches expérimentales sur les causes de l'émergence des feuilles de nénuphar. [Experimental researches on the causes of the emergence of the leaves of the water-lily.] Compt. Rend. Acad. Sci. Paris 169: 988-990. 1919.—Previous writers have stated that water-lilies growing at a depth of 32-40 cm. produce leaves which float on the surface of the water, but in water shallower than this the leaves emerge. The author, however, has noted water-lilies growing at a depth of 80 cm. with leaves projecting from the water and he attempts to determine the cause of this phenomenon. Plants were grown in containers of wood, glass, and zinc of varying depths and of various diameters. Grown in glass or wooden receptacles having a depth of 50 cm. or less, the leaves did not emerge. It was noted in certain experiments that there appeared to be a relation between the number of leaves and their behavior. When more leaves were present there seemed to be a greater tendency for the leaves to emerge. In the 1st case noted, however (plants growing at a depth of 80 cm.), no such cause existed since there was no crowding of the leaves. It was noted in this case, however, that the water was covered with *Lemna* which had brought on the death of older leaves of water-lily and of *Hydrocharis*. The water was shown to be fetid and to contain marsh gas. Both the water lily and *Hydrocharis* appeared to emerge to secure air. Both *Elodea* and *Fontinalis* appear to respond in a similar fashion when in danger of asphyxiation. The author concludes that the emergence of water-lily leaves in limited space may be due to the competition between them and in other cases to the struggle between the water-lily and surrounding vegetation. Variations in the water level bear no relation to the phenomenon.—V. H. Young.

2298. DAVY DE VIRVILLE, AD. Modification de la forme et la structure d'une mousse, *Hypnum commutatum* Hedw., maintenue en submersion dans l'eau. [The modification of the form and structure of a moss, *Hypnum commutatum*, maintained in submersion under water.] Compt. Rend. Acad. Sci. Paris 172: 168-173. 1921.—A comparison is made of the length and breadth of the leaves and of the size of the cells of plants growing under water and in the air. It is found that the length in each case is less, but that the width of the cells is not especially affected. The stems, however, are 2-3 times as long as those in air.—C. H. Farr.

2299. PHILLIPS, E. P. Adaptations for the dispersal of fruits and seeds. South African Jour. Nat. Hist. 2: 240-252. Pl. 2-3. 1920.—In the regular methods of seed dispersal 4 agencies are employed,—wind, water, animals, contraction of certain tissues of the fruit.—E. M. Doidge.

2300. SCHROEDER, H. Kräuter und Stauden im Wechsel der Jahreszeiten. [Herbs and shrubs with the change of seasons.] Schriften Naturwiss. Ver. Schleswig-Holstein 17: 199-200. 1920.—A synopsis of a lecture on the behavior of plants during the winter is here given. Various compromises are brought out between structural features which secure the greatest possible protection against the cold and those which enable the plant to utilize the period of the year more favorable for growth and other functions.—A. W. Evans.

#### VEGETATION

2301. BEAUCHAMP, P. DE. Recherches biogéographiques sur la zone des marées à l'île de Ré. [Biogeographical studies on the tidal zone of the island of Ré.] Compt. Rend. Acad. Sci. Paris 171: 1233-1236. 1920.—This consists of a report on the fauna and flora of the zone between high and low tide on this island.—C. H. Farr.

2302. CLUTE, WILLARD N. **Botanizing in the painted desert.** Amer. Bot. 27: 1-8. 1921. —This is a description of an oasis with its 3 types of flora,—the encroaching desert flora, the hydrophytic flora around the springs, seeps, etc., and the flora of the cultivated lands.—S. P. Nichols.

2303. FORBES, H. **An account of the flora of the Malvern District.** South African Jour. Nat. Hist. 2: 195-208. 1920.—This district consists chiefly of grassland. Aloes seem to thrive well on the cliffs of the Umhlutuzana River. Comparatively few xerophytic plants are to be found in this district.—E. P. Phillips.

2304. PEARSALL, W. H. **The aquatic vegetation of the English lakes.** Jour. Ecol. 8: 163-201. 18 fig. 1920.—Detailed studies were made of 12 lakes of the hill country of Cumberland, Westmoreland, and Lancashire. "The distribution of the aquatic plants considered is primarily governed by the nature of the substratum, while the reaction of the substratum to vegetation is controlled by variations in the quality and quantity of sediments deposited on it by the type and quantity of organic matter it contains. Light intensity may limit the depth to which types of vegetation descend, but is of secondary importance as a factor in the distribution of most of the plants considered. Temperature conditions are assumed to retard the development of vegetation during early summer, but in other respects to be of little significance. The absence of free floating vegetation is attributed to the paucity of the waters in essential plant food substances. Plant succession is accompanied by changes in the substratum akin to those resulting in the formation of moor peat."—Geo. D. Fuller.

2305. POLE EVANS, I. B. **The veld, its resources and dangers.** South African Jour. Sci. 17: 1-34. Pl. 1-28, 1 map. 1920.—This is the presidential address delivered to the South African Association for the Advancement of Science in July, 1920. The author divides South Africa into 19 botanical regions, the main types of vegetation being intimately associated with the physical features of the country. These regions are: (1) the Coast Veld, a region of drowned valleys and sandy dunes covered with dense impenetrable bush, tall grasses and palms, and in which isolated evergreen forests are frequent; (2) the Low Veld, a region of low relief, of wide open river valleys with perennial streams and deep alluvial soils, which are covered with gigantic thorn and other deciduous trees beneath which a rank growth of grass persists; (3) the Eastern Grass Veld including the southeastern region, the great Escarpment and the Basuto Highlands; (4) the Bushveld; (5) the Middle or Banken Veld, a region of gently sloping hills from which escarpments of harder rock project, the hill slopes being covered with grass and the rocky hills with stunted deciduous trees and sclerophyllous bush; (6) the High Veld; a region of vast rolling table lands covered with a dense grassy turf and devoid of trees; (7) the Pietersburg High Veld; (8) the Waterberg Sand Veld; (9) the Griqualand West Thorn Veld; (10) the Kaap Plateau Bush Veld; (11) the Vaal Kameeldoorn Veld of the Asbestos Mountains; (12) the Kalahari Sand Veld; (13) the Damaraland Thorn Veld; (14) the Kameeldoorn Veld of South Damaraland; (15) the South Western Veld; (16) the Karroo; (17) the Upper Karroo; (18) the Kokerboom Veld of Namaqualand and Bushmanland; and (19) the Namib or Western Littoral Belt. The principal physical features of each region are described and an account is given of the vegetation of each, with special reference to its economic aspects. The paper is illustrated by an exceptionally fine series of 56 photographs.—E. M. Doidge.

2306. WADHAM, S. M. **Changes in the salt marsh and sand dunes of Holme-next-the-sea.** Jour. Ecol. 8: 232-238. 4 fig. 1920.—The article is a report of the changes in vegetation occurring in 6 years. Maps of the distribution of the plant communities in 1914 and in 1920 are presented. In the salt marsh emphasis is placed upon the length of time the water floods the different areas during the tides and this is regarded as the controlling factor for the distribution of associations of *Armeria*, *Statice*, and *Plantago*. Various types of depressions or "pans" are characterized.—Geo. D. Fuller.

2307. YOUNGKEN, HEBER W. **Plant associations.** Jour. Amer. Pharm. Assoc. 9: 1052-1055. 1920.—In this brief exposition of plant associations, classified solely on the basis

of their relation to water, those discussed are: hydrophytes, helophytes, or marsh plants, halophytes, xerophytes, mesophytes, and tropophytes, or alternate plants.—*Anton Hogstad, Jr.*

## FLORISTICS

2303. ARMITAGE, ELEANORA. Glamorganshire Bryophyta. *Jour. Botany* 59: 49-50. 1921.—A list of bryophytes collected by H. H. Knight, the author, and others in Glamorgan is given.—*K. M. Wiegand.*

2303. BURNHAM, STEWART H., and ROY A. LATHAM. The flora of the town of Southold, Long Island and Gardiner's Island. *Torrey* 21: 1-11. 1921.—A 2nd supplementary list of plants collected since the publication of the original Flora in 1914 is presented, comprising 133 species of thallophytes, 3 of bryophytes, and 5 of pteridophytes. Notes on habitat, station, and determinations are added.—*J. C. Nelson.*

2310. CHAMPIM, H. C., and W. J. LAMBERT. Notes on a visit to the Pindari Glacier, Kumaon. *Indian Forester* 47: 11-21. 1 pl., 1 fig. 1921.—The plants found en route to the glacier are enumerated.—*E. N. Munn.*

2311. COLLINS, J. FRANKLIN. Three plants new to Rhode Island. *Rhodora* 23: 27. 1921.—The author reports 3 plants from Rhode Island with the stations in New England where they have been reported. These do not appear to have been previously listed from the state. They are *Hedeoma hispida* Pursh., *Apocynum median* Greene, and *Potentilla tridentata* forma *hirtifolia* Pease.—*James P. Poole.*

2312. GARLAND, L. V. LESTER. Some plants from Jebel Marra, Darfur. *Jour. Botany* 59: 46-48. 1921.—This is a list of 45 plants collected on the mountain Jebel Marra, by Captain H. Lyles, in 1920. Some notes on the region are appended. The flora is a composite of the floras of north temperate, Mediterranean, Abyssinian, Sudanese, and widespread tropical types.—*K. M. Wiegand.*

2313. GORMAN, M. W. The flora of Mount Hood. *Oregon Out of Doors* [Portland] 1: 64-96. 1920.—This list of the known flowering plants and ferns of Mount Hood, under both common and scientific names, includes notes on altitudinal distribution.—*C. V. Piper.*

2314. JANCHEN, ERWIN. Vorarbeiten zu einer Flora der Umgebung von Skodra in Nord-Albanien. [Contributions to a flora of the vicinity of Skodra in North Albania.] *Österreich. Bot. Zeitschr.* 69: 128-143, 167-187. 1920.—In this list of 770 species of plants collected within 6-7 km. of Scutari by Janchen and another military officer during the period from 1917 to 1919, specific names, synonyms, brief descriptions, and localities are given.—*E. M. Gilbert.*

2315. KIDDER, NATHANIEL T. Additions to the flora of Isle au Haut. *Rhodora* 23: 26. 1921.—*Salix coactilis* Fernald, *Carex norvegica* Willd., and *Triglochin palustris* L. are reported. None of these species has previously been reported from the immediate region.—*James P. Poole.*

2316. MAXWELL, HERBERT. *Spiranthes autumnalis*. *Nature* 106: 409. 1920.—This record from Scotland [Nature 106: 79.] is perhaps an error for *Goodyera repens*.—*O. A. Stevens.*

2317. MELVILL, J. COSMO. *Hieracium amplexicaule* L. *Jour. Botany* 59: 48-49. 1921.—This is a note on the occurrence of this species along the Mersey river between Stretford and Sale. It is a rare introduced plant, but has a good claim to a place in the British flora.—*K. M. Wiegand.*

2318. MERRILL, ELMER D. Comments on Cook's theory as to the American origin and prehistoric Polynesian distribution of certain economic plants, especially *Hibiscus tiliaceus*

**Linnaeus.** Philippine Jour. Sci. 17: 377-384. 1920.—The writer is opposed to the theory that this hibiscus was carried by the primitive Polynesians from America across the tropical regions of the Old World and is to be taken into account as an economic plant. He maintains on purely botanical evidence that it is a species of natural pantropic distribution, that it grows in all tropical countries along the seashore, and that it has been disseminated in ages past by ocean currents, the seed being adapted for such dissemination.—*Albert R. Sweetser.*

2319. **MOUSLEY, H.** The ferns of Hatley, Stanstead County, Quebec, 1920. Canadian Field-Nat. 34: 137-140. 1920.—Forty-one species and varieties of ferns representing 3 families were collected within a very small area surrounding Hatley.—*W. H. Emig.*

2320. **NELSON, JAMES C.** Additions to the flora of Western Oregon during 1920. Torreya 21: 24-28. 1921.—A list is presented of 34 species found growing spontaneously, none of which is mentioned in Piper & Beattie's Flora of the Northwest Coast. Of these 29 are plainly introduced. Parish's recent study of the Immigrant Plants of Southern California includes only 290 species, while at least 450 have been reported in Western Oregon. This is due partly to the greater aridity of the California summer. The plants of Western Europe find more favorable conditions in Western Oregon because of the more abundant rainfall.—*J. C. Nelson.*

2321. **POTT, R.** Addendum to the first check list of the flowering plants and ferns of the Transvaal and Swaziland. Ann. Transvaal Mus. 6: 119-135. 1920.—This is an addendum to the 1st check list of the flowering plants and ferns of the Transvaal and Swaziland published May, 1912, and is based chiefly upon records from the Transvaal Museum Herbarium, and upon other published records.—*E. M. Doidge.*

2322. **SALMON, C. E.** *Carex Pairaei* in Ireland. Jour. Botany 59: 76. 1921.—This is an account of the discovery of this plant by Dr. Scully near Dublin in 1919, and its subsequent collection by A. W. Stelfox.—*K. M. Wiegand.*

2323. **SCHAFFNER, J. H.** Additions to the catalog of Ohio vascular plants for 1920. Ohio Jour. Sci. 21: 128-135. 1921.—A list of 93 names is given, including a number of species new to Ohio, and others which extend their range of distribution in the State. Because of its peculiar geographic position, Ohio has an unusual number of species having their limits within its boundaries.—*H. D. Hooker, Jr.*

2324. **STANDLEY, PAUL C.** Ferns of Glacier National Park, Montana. Amer. Fern Jour. 10: 97-110. 1920.—The author discusses briefly the geographic features of the Park and outlines the 4 life zones represented there,—the Transition, Canadian, Hudsonian, and Arctic-Alpine zones. Then follows a list of 39 species of pteridophytes distributed among 15 genera. The abundance and habitat are given for each species.—*P. C. Anderson.*

2325. **STANDLEY, PAUL C.** Flora of Glacier National Park, Montana. Contrib. U. S. Nation. Herb. 22<sup>5</sup>: 235-438. Pl. 33-52. 1921.—This paper is intended to be a guide to the flora of Glacier National Park, and will be useful also in the mountainous regions of Idaho and British Columbia. In the introduction a short account is given of the geological features and life zones of the Park, of the local climatic conditions in their effect on plant life, and of previous collections from the region. A bibliography of publications on the botany of the Park is also given, followed by keys to the families. Short diagnoses of the families, and in most cases of the genera, are given. Under each species the local occurrence and the general range are given, followed by brief descriptions of essential features of the plants, and accompanied by notes on the appearance or local uses of the species. The plates give illustrations of the scenery and of a few of the characteristic plants of the Park. The following names are new: *Aquilegia Jonesii elatior* Standl., subsp. nov.; *Sophia parviflora* (Lam.) Standl. *Oxytropis spicata* (Hook.) Standl. In this work 955 species are enumerated, nearly all of which were collected by the author in 1919.—*S. F. Blake.*

2326. THOMPSON, H. STUART. *Agrostis nigra* in France: a correction. Jour. Botany 59: 77. 1921.—This plant listed from Var in Jour. Botany 1913, p. 196, proved to be *Poa trivialis*.—K. M. Wiegand.

2327. WATERS, C. E. The ferns of Baltimore and vicinity. Amer. Fern Jour. 11: 19-25. 1921.—The list, comprising about 31 species distributed among 13 genera, is very similar to that for the District of Columbia.—F. C. Anderson.

#### APPLIED ECOLOGY

2328. SIM, T. R. Causes leading towards progressive evolution of the flora of South Africa. Presidential address to Section C. South African Ass. Adv. of Sci. 1920. South African Jour. Sci. 17: 51-64. 1920.—By maintaining the eastern grass veld unburned, by maintaining the forests or replacing them by exotic species of more rapid growth and of greater transpiration, and by vastly increasing the area under such exotic trees especially in the grass veld slopes and in the natural tree and scrub lands and on the mountains, the amount of saved and redistributed moisture is increased enormously. On the other hand, by continued grass burning, forest destruction, over-stocking veld, bad agriculture, water concentration and donga formation, practically all rain is drained off immediately. There is very little redistributed moisture and that little becomes less year by year. South Africa is still in the stage when the fly-wheel of natural sequence may be started either in the direction of afforestation and grass protection, leading to upward plant succession, accompanied by general vegetative and climatic improvement, or in the direction of veld fires, forest destruction, and down-grade vegetation, reacting on the climate, which again reacts on the vegetation until at last the continent is past redemption and mankind as well as the fauna and flora must perish.—E. M. Doidge.

#### FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 2095, 2120, 2226, 2284, 2582, 2602, 2639, 2961, 3013, 3179, 3194 3197)

2329. ANONYMOUS. Forsøgsvaesendets Ordning og Ledelse. [Organization and administration of forest research.] Forst. Forsøgsv. Danmark 5: 391-420. Pl. 7, fig. 2. 1921.—Organization, administration, headquarters, activities, and experimental fields of the Danish Forest Experiment Station are discussed. Mr. A. Oppermann is the present leader. With him, working along more or less special lines, are 6 permanent members. Their activities, coordinated with the Department of Agriculture, are approved by a committee of which the Director is a member. In 1917 appropriations were made for substantial headquarters of 5 buildings and 1 permanent caretaker. The plantations and experimental tracts are in different parts of the country. The 2 nurseries are at Egelund and Møllevangen. Numerous planting tests have been made with native and exotic species. Aside from forestation experiments considerable work has lately been done in biology of forest soils, forest mensuration, utilization, insect enemies of trees, and forest influences.—J. A. Larsen.

2330. ANONYMOUS. Government forest work in Utah. U. S. Dept. Agric. Dept. Circ. 198. 51 p. 1921.—A popular digest.—L. R. Hesler.

2331. ANONYMOUS. Shall the Forest Service be eliminated from Alaska? Amer. Forestry 28: 37. 1922.—Editorial.—C. H. Otis.

2332. ANONYMOUS. The forestry department of Edinburgh University. Nature 106: 706-707. 2 fig. 1921.



2333. ANONYMOUS. *Vers la futaie. [Tending towards high forest.]* Bull. Trimest Soc. Forest. Franche-Comté et Belfort 14: 207. 1921.—Of the numerous communities of Haute-Saône which have agreed to convert their coppice into high forest, 10 are noted, with the areas to be converted. The method is to substitute for the coppice cuttings on a 25 or 30 year rotation improvement cuttings at periods of 12-15 years, with a limit of 30 per cent of volume of the material to be cut. No change in the division of the forest into parcels is contemplated. In the mountainous regions, planting of fir is prescribed immediately after cutting.—*J. Kittredge, Jr.*

2334. ANONYMOUS. [Rev. of: TROSCHEL, ERNST, Editor. *Handbuch der Holzkonservierung. (Handbook of wood preservation.)* xi + 450 p. Julius Springer: Berlin, 1916.] Nature 199: 73. 1922.—This work by 12 authors is highly commended.—*O. A. Stevens.*

2335. AMILON, J. A. *Sveriges Prästskogar. [Sweden's ecclesiastical forests.]* Skogsvårdsför. Tidskr. 19: 144-156. 1921.

2336. ANDERSSON, GUNNAR. *Världens Barrskogstillgångar. [The world's coniferous forest resources.]* Skogsvårdsför. Tidskr. 19: 1-32. Fig. 1-8. 1921.—Forest conditions, production, and consumption are discussed for the principal countries of the world. The conclusion reached is that the future demand for forest products is going to exceed the supply.—*G. A. Pearson.*

2337. ARX, WILH. VON. *Electrische Leitungen durch Waldungen. [Electric power lines through forests.]* Schweiz. Zeitschr. Forstw. 72: 299-304. 1921.—The author calls attention to the dangers of allowing free use of forests for power lines, and advocates charges for power lines and water power sites. Definite plans are outlined. The importance of having power lines in underground cables is emphasized.—*J. V. Hofmann.*

2338. BADOUX, H. *Köhlerei im waadtelandischen Jura. [Charcoal pitting in Waadt, Jura.]* Schweiz. Zeitschr. Forstw. 72: 293-298. 2 pl. 1921.—Charcoal burning is a past industry in Switzerland, although it was quite extensively practiced prior to 1898. In Saint Croix in 1917 a single operator was found, and his supply was consumed locally. The species used in the various localities totaled about as follows: beech 22.7, oak 21.3, willow 20.6, birch 20.9, pine 25 per cent. The 4 pits in operation required 65-110 ster of wood each and burned 8-20 days. Although the price advanced from 8.50 Fr. per kgm. in 1912 to 42. Fr. in 1918, it would not be feasible to reopen the industry in Switzerland.—*J. V. Hofmann.*

2339. BIRCH, J. J. *Mahogany.* Amer. Forestry 27: 710, 727. 1921.

2340. BORNEBUSCH, C. H. *Objective beskrivelse af et Skovdistrikts Urteflora. [Objective description of herbaceous flora in a forest.]* Dansk Skovfor. Tidsskr. 6: 76-81. Pl. 4, fig. 2. 1921.—The author's method of taking stock of the herbaceous flora in a forest is called objective because it will be possible to repeat comparisons by the same or different persons at different times. A map of suitable scale is used in the field for designation of type boundaries; within these types, symbols indicate characteristic species in distribution and abundance. Closer analysis is made according to Raunkiaer's method for the different types of flora. The tables in this report show occurrence and frequency for a particular area in Denmark.—*J. A. Larsen.*

2341. BUSSE. *Der Wald in Zeiten politischer Umwälzungen. [The forest in times of political revolutions.]* Zeitschr. Forst- u. Jagdw. 53: 193-206. 1921.—This address, delivered at the anniversary celebration of the Eberswald forest academy, gives a short account of German forest history with especial reference to the destructive influences of political revolutions, such as those of 1524, 1848, and 1914-18, upon the forest, and summarizes the economic significance of the German forests before the late war. The author outlines the present problems facing the German forester.—*J. Roesser.*

2342. BUSSE. *Mein Reiseeindruck von Bärenthoren*. [My travel impressions of Bärenthoren.] *Zeitschr. Forst- u. Jagdw.* 53: 157-162. 1921.—Von Kalitsch's Bärenthoren management system is based on care and culture of the soil and of the stand. Schwappach has stated that the soil in Bärenthoren is better than it appears to be, even under mismanagement, and natural regeneration of pine is a logical result. The felling scheme or silvicultural system is not orderly, and it is necessary to log through stands of heavy reproduction; von Kalitsch will eventually have to adopt a form or orderly regulation. The entire forest does not present a new form, but gives very much the appearance of a high forest system with natural regeneration, even though preparation fellings, reproduction fellings, etc., are not recognized. This is due to the extraordinary recuperative powers of clumps of pine reproduction and their habit of forming even-sized stands, although not even-aged, upon removal of the old trees.—*J. Roesser*.

2343. CALVINO, M[ARIO]. *El Aromo Amarillo, planta de tanino*. [The Aromo Amarillo, a tannin-containing plant.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 590. 1921.—*Acacia farnesiana* Willd. grows extensively on poor land in Cuba. Mature pods without the seed contain 23.2 per cent tannin. The fruit is composed of 53 per cent by weight of seed and 47 per cent of pod.—*G. R. Hoerner*.

2344. CALVINO, MARIO. *Los mimbres*. (Genero: *Salix*.) [The willows.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 624. 1921.—The species mentioned are *Salix rubra*, *S. viminalis*, *S. vitellina*, *S. purpurea* and its hybrids, and *S. alba*. A discussion of the uses, propagation, soil requirements, planting, and importance of the crop is given. The cultivation of willows and the promotion of the willow industry in Mexico are discussed.—*G. R. Hoerner*.

2345. CALVINO, M[ARIO]. *Otra planta arbórea de la familia de las leguminosas rica en tanino*. [Another arboreal plant of the legume family rich in tannin.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 590. 1921.—A legume from Mexico, *Huamuchil Pithecolobium dulce* (Roxb.) Benth., growing in the Agronomic Experiment Station grounds in Cuba, produces bark containing 25 per cent tannin. Seeds may be obtained from the station upon request.—*G. R. Hoerner*.

2346. CARLSON, K. A. *Cedrela Toona, a silvicultural note, with special reference to natural regeneration in the Government plantation, Barberton*. *Jour. Dept. Agric. Union South Africa* 3: 231-245. *Pl. 1-5*. 1921.—The optimum conditions for *Cedrela toona* for the Union are as follows: the nearer the climate approaches tropical conditions the better. In the Zoutpansberg Range elevations up to 4,000 feet may be planted, but further south an altitude 3,000 feet or less should be selected. An average rainfall of 30 inches and upwards is needed, sub-soil moisture or a moisture-retentive soil is necessary for a dense stand to survive long spells of drought and proximity to Eucalypts or other moisture-exhausting species is harmful. Rich alluvial soil is best, and skilful silvicultural management is necessary.—*E. M. Doidge*.

2347. CARLSON, K. A. *Timber supplies and industrial progress*. *South African Jour. Indust.* 5: 11-18. 2 fig. 1922.—The need of more extended afforestation in South Africa is emphasized. Figures and statistics from the industrial centres of the world are cited. The author believes that the forests of the world are being depleted more rapidly than they are being replaced, and that no country can hope to attain great industrial prosperity unless largely self-supporting in timber.—*S. M. Stent*.

2348. CARTER, C. F. *Our reforestation activities*. *Sci. Amer.* 125-A (Dec.): 106-107. 5 fig. 1921.

2349. CHEVALIER, AUG. *Situation de la production du caoutchouc en 1921*. [Rubber production in 1921.] *Rev. Bot. Appl.* 1: 33-103. 1921.—In a rather lengthy article the writer

considers: (1) The present condition of the world rubber market and the geographic relationships of the chief rubber-producing plantations; (2) the culture of *Hevea brasiliensis* in French Indo-China and its future in that country; (3) the production of wild rubber in various parts of tropical Africa. He concludes that the production of wild rubber is on the decrease in tropical Africa, and that it is not possible to establish European plantations in Africa capable of competing with those of French Indo-China or Indo-Malaysia, but that it is very necessary that local governments should organize experiment stations for the education and guidance of colonists and natives.—*P. G. Russell.*

2350. CHEVALIER, AUG. [Rev. of: BRIEF JACQUES DE. *Mission Forestière et Agricole au Mayumbe (Congo belge). Documents mis en ordre et annotés par E. de Wildeman. (The commission of forestry and agriculture at Mayumbe (Belgian Congo). Edited by E. de Wildeman.)* Brussels, 1920.] *Rev. Bot. Appl.* 1: 29-31. 1921.—The book was published after the death of the author. There are 4 principal subjects treated; (1) The forests and timber of Mayumbe, (2) yams, (3) bananas, and (4) the oil palms.—*P. G. Russell.*

2351. CORNEFERT, R. *Régénération sur les hauts plateaux du Jura.* [Regeneration of the high plateaux of the Jura.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 206. 1921.—Regeneration of the forests of the Jura becomes difficult at over 1100 m. altitude. Owing to the luxuriant herbaceous vegetation which immediately follows the melting of the snow, the natural reproduction of spruce is crowded out. Artificial regeneration is therefore necessary and nurseries have been established. The fungus *Herpotrichia nigra*, which vegetates under snow, is a serious enemy of the nursery stock of spruce which is pressed to the ground by snow. A process of preventing damage has given excellent results: in the autumn, barked poles 10-15 cm. in diameter are placed between the ranks of plants, so that the plants lean upon them. In the field each plant is similarly placed where it can be supported by a stone or a stump. It is useless to attempt to reforest the pot holes which exist on these high plateaux.—*J. Kittredge, Jr.*

2352. COX, S. *Annual administration report of the forest department of the Madras Presidency for the forest year ending June 30, 1920.* 76 + *lxi* + 17 p. 1921.—This annual report covers in detail all forest operations. During the year the area of reserved forest increased from 18,712 to 18,794 square miles, and that of reserved land decreased from 682 to 565 square miles. Of 36,700 miles of boundary all but 2,000 miles have been demarcated. Little progress was possible either in the preparation of new or in the revision of old working plans. Some progress was made in construction of new roads and in improving water supply. Trespasses of all kinds continue to increase. Most grazing and cutting trespassers are detected and punished, but fire trespass, the most serious, is not yet adequately met. Severe forest fires occurred, and not less than 1,000 square miles of specially protected forest was burned during the year, including some important plantations. Early burning as a protection against disastrous summer fires was inaugurated in some areas, and is said to have furnished satisfactory protection. The effect of repeated fires on the forests in delaying natural regeneration is noted. The output of timber increased from 98,580 to 105,800 tons, and of fuel wood to 549,700 tons. The minor forest products such as bamboo and tanning bark also show an increase. Grazing revenues were the highest recorded in the past 10 years. Increased artificial propagation of sandalwood is noted. Research work is still inadequately handled. The net revenue for the year was Rs. 24,37,482 as compared to a 10-year average of 14,75,458. The sudden increase was due largely to high prices following the war. A separate report is given for each of the 4 circles in the Presidency, with a summary for the entire Presidency.—*S. B. Shaw.*

2353. DACY, G. H. *Sherlock Holmes of the forests.* *Amer. Forestry* 28: 72-75. <sup>10</sup>fig. 1922.—The author gives a graphic description of the activities of organized forest rangers in California and their methods of gathering data and interpreting evidence which will lead to the identification and location of incendiaries.—*Chas. H. Otis*

2354. DENZIN. *Altersklassen und Betriebsklassen.* [Age classes and working sections.] *Zeitschr. Forst- u. Jagdw.* 53: 129-143. 1921.—This critical comparison favors the Prussian working plan instructions of March 17, 1912, over the supplemented instructions of March 12, 1919. The old system furnished an inventory of the stand in that it called for a division by age classes and a summary for all the species in mixture. The new instructions avoid this, the scheme of management being governed by the principal species in the mixture. One working-section may contain species of widely separated rotation ages, which contradicts the purpose of establishing a working-section. Further more, the normal removal age of the stand is based on the period of rotation of the principal species with a total disregard of the rotation age of perhaps a greater area of an associated species. The old system provided for an age class division and representation on the ground of each distinct rotation represented in the stand.—*J. Roeser.*

2355. EBERTS. *Die Thüringer Waldwinde.* [The Thuringia forest windlass.] *Zeitschr. Forst- u. Jagdw.* 52: 420-422. *Fig. 1-2.* 1920.—This is a light hand-apparatus for uprooting trees, consisting mainly of a windlass fastened low down on one tree, and a steel wire rope leading to a hook fastened high up on the tree to be felled. The tree is pulled over by winding the windlass.—*A. H. Graves.*

2356. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 2.* *South African Jour. Indust.* 4: 737-744. *7 fig.* 1921.—The total yield of timber from all the forests of South Africa falls far short of the local demand. At the same time it is evident that sufficient use is not made of the very good timber that the country can produce, and this is largely because the local timber is badly seasoned and quite unreliable. In this article are discussed in detail the general principles and theories of cutting and seasoning and the adaptation of these to the climate of South Africa, and the damage done to wood by fungi and insect pests.—*S. M. Stent.*

2357. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 3.* *South African Jour. Indust.* 4: 778-787. *4 pl.* 1921.—This article gives in detail the best methods of seasoning wood, with special reference to, and description of, the Pretoria kilns.—*S. M. Stent.*

2358. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 4.* *South African Jour. Indust.* 4: 847-854. 1921.—This article deals entirely with up-to-date methods of seasoning wood as carried out at the Pretoria kilns and directed by the Department of Forests in cooperation with the South African Railways. The most useful and abundant indigenous timbers of South Africa are the yellow woods (*Podocarpus* spp.). The treatment of false yellow-wood (*P. falcata*) is described in detail.—*S. M. Stent.*

2359. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 5.* *South African Jour. Indust.* 4: 896-904. *2 fig.* 1921.—In this article the seasoning of the 2 other South African yellow woods—common or Outeniqua yellow wood (*Podocarpus elongata*) and real or upright yellow wood (*P. Thunbergii*)—is described. The severe tests which the seasoned yellow wood has stood is positive proof of the perfection of the treatment. The supreme test is the making of patterns for metal castings, which patterns have remained true after constant use.—*S. M. Stent.*

2360. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 6.* *South African Jour. Indust.* 5: 57-65. *6 fig.* 1922.—The best methods of seasoning the wood of Eucalypts in general and the Karri gum (*Eucalyptus diversicolor*) in particular are given.—*S. M. Stent.*

2361. ECKBO, NILS B. *Industrial timber research abroad and in South Africa. 7.* *South African Jour. Indust.* 5: 116-121. *5 fig.* 1922.—The necessity of preserving wood, especially in South Africa, from the destroying agents—fungi, insects, and fire—is discussed.—*S. M. Stent.*

2362. EDEN, JOHAN. Något om Skogsbokföring ock Skogsstatistik. [Forest book-keeping and forest statistics.] Skogsvårdsför. Tidskr. 19: 51-76. Fig. 1-8. 1921.

2363. EICHHORN. Die beste Bestandsform und das beste Einrichtungsverfahren. [The best silvicultural form and the best working plan.] Zeitschr. Forst- u. Jagdw. 53: 33-44. 1921. Möller's recent account of his Bärenthorener continuous management in pine [see Bot. Absts. 9, Entry 186; 11, Entry 2394] and Eberbach's late admonition in "Silva" recall the latter's announcement in 1913 in which he suggested setting aside the governing silvicultural forms and accepting the selection forest as the standard. The author regards Eberbach's general conclusions impracticable. Eberbach also overvalues the inventory of stock for the purpose of establishing the increment; in mixed stands it is doubtful that his system is as reliable as the present yield tables and measurement of sample plots. His "middleforest," suggested as the best unevenaged form for intolerant species, cannot be considered as a silvicultural form of the future. The author is also at a loss to account for Eberbach's disregard of separation of final from intermediate yields, since he places great weight on the care and control of the growing stock. The "natural" silvicultural form of Eberbach and its yield regulations can not serve as a standard for German forest management.—J. Roesser.

2364. EKMAN, WILH. Några Skogspolitiska Problem för Norrland. [Forest political problems in Norrland.] Skogsvårdsför. Tidskr. 19: 33-50, 77-101. Fig. 1-19. 1921.—Norrland is a large, sparsely settled province in northern Sweden. Timber is one of its greatest resources. The population and the timber business have increased steadily since 1870. The lumber industry has furnished employment in the past; a stable forest policy will assure its permanence. Although destructive logging has been the rule in past years, and private owners are still inclined to sacrifice future for present returns, there are many examples of intensive forestry by private owners. National forest laws now prohibit forest devastation on private as well as public lands. Apparently the enforcement of these laws is dependent in a large measure upon the good will of the owner.—In the more remote sections, the practice of forestry encounters difficulties in shortage of labor, lack of housing facilities, and inadequate transportation. The remedy for the last 2 of these conditions lies in agricultural settlement, which is dependent upon the employment and presumably the markets furnished by lumbering and forestry. Emphasis is placed upon the importance of fostering among settlers a favorable sentiment toward forestry, as a means both of creating a source of dependable labor and of encouraging the practice of forestry by farmers. Removal of certain legal restrictions hampering the lumber industry, farmer, and laborer is urged. The article concludes with an appeal for cooperation between the lumber industry, forestry, and agriculture as the only solution for the economic problems of Norrland.—C. A. Pearson.

2365. ERDMAN. Künstliche Düngung im Walde. [Artificial manuring in the forest.] Zeitschr. Forst- u. Jagdw. 53: 155-157. 1921.—Experiments in the use of lime and other fertilizers do not substantiate the theory that they have no effect on the better class of soils. Although some tests yielded no evident results, others showed a decided, if not uniform, influence on plant development. For soils of average lime content more data are necessary. Beech can be retained on even the poorest soils by the application of lime. If a degenerated forest soil be properly cultivated by removing the dry peaty surface covering and either sowing broadcast or planting close, beech is able to thrive and grow with astonishingly small amounts of lime in the soil.—J. Roesser.

2366. FANKHAUSER, F. VON. Verbauung und Afforstung in den Einzugsgebieten der Wildbäche. [Terracing and afforestation for the control of irregular streams.] Schweiz. Zeitschr. Forstw. 72: 257-260. 1921.—In this reply to Marti [see Bot. Absts. 11, Entry 2360] it is claimed that the cost of terracing is prohibitive, and that it is not as effective as afforestation, especially on steep slopes. The greatest factor in control of the streams is larger forest holdings on the watersheds and complete stocking.—J. V. Hofmann.

2367. GESCHWIND, A. Die Technik der Wesselyschen Resurrektionshiebe in den Laubholzkrüppelwaldresten des Karsten. [Wessely's resurrection method of treatment in the stunted hardwoods of the Karst region.] *Centralbl. Gesam. Forstw.* 46: 193-218. 1920.—A considerable part of the Karst region is covered with a sprout forest of mixed hardwoods, which at present is in a stunted and almost devastated condition due to overcutting and excessive grazing. Heavy browsing by stock prevents the shoot growth from developing. Wessely's method of rehabilitating is to allow the root-stocks to develop unhindered and to plant nursery stock in the openings. The rehabilitating areas should be fenced to prevent grazing for several years. The author discusses also the influence upon sprout regeneration of drought, frosts, insects, fungi, and in particular the cold and desiccating bora, which sweeps this region. As root sprouts are stronger than stump sprouts, the stump height should be 3-5 cm. above the point of connection between the trunk and root. The cutting should be done just before the sap flows.—*R. H. Weidman.*

2368. GREELEY, W. B. Fires on the national forests. *Amer. Forestry* 28: 49-51. 1922.

2369. GROSSCURTH. Die Verjüngung der hessischen Kiefernbestände mit Buche und deren Einbringung. [The regeneration of Hessian pine forests with beech and its method of introduction.] *Zeitschr. Forst- u. Jagdw.* 53: 173-178. 1921.—The author discusses the natural regeneration of pine and beech in mixed stands in the forest district Wildeck and the artificial introduction of beech in pine stands and pine in pure beech stands, and outlines rules governing thinning operations in mixed stands.—*J. Roeser.*

2370. GUTHRIE, J. D. Forestry awakening in Washington. *Amer. Forestry* 28: 51. 1922.

2371. HALL, A. F., Editor. *Handbook of Yosemite National Park.* xiii + 347 p., 26 pl., 12 fig. G. P. Putnam's Sons: New York and London, 1921.—The book includes, among others, the following chapters: Trees of Yosemite Park, pp. 219-234, by Hall; The Giant Sequoia, pp. 235-246, by W. L. Jepson; Flowers of the Yosemite, pp. 247-267, Jepson; and a key to cone-bearing trees in the appendix.—*R. S. Harris.*

2372. HASLUND, OVE. Granskogens produktion og rentabilitet. [Production and rate of interest of spruce forests.] *Tidsskr. Skogbruk* 29: 160-224. *Fig. 15.* 1921.—This reports growth in diameter, height, and volume of Norway spruce of different diameter classes for trees of different form and for qualities I and II sites. The data are based on 1,971 sample trees representing 4-5 per cent of 65,000 dekar. Trees of low form point show up best in growth of diameter and volume production per individual tree. This is more true for the small than for the larger trees. Those of high form point, which are usually the older, have less crown space, stand close, and produce more volume per acre than the trees of low form point. If the forest loses the better formed trees by careless or unregulated cutting and selection for special material, as has been the case in the past, the forest production and financial yield will decrease. It is shown that trees of higher form point yield better return on the money invested in the forest than others. It is also pointed out that too high returns should not be expected from capital invested in forests; in Norway 3.5-4 per cent is considered fair for large private holdings and 4-4.5 for small private holdings.—*J. A. Larsen.*

2373. HAUCH, L. A. Faren ved Plukhugst i Danske Skove. [The danger from selection cutting in Danish forests.] *Dansk Skovfor. Tidsskr.* 6: 65-75. 1921.—The author regards selection cutting, advocated by F. Muus in a previous article, injurious to the Danish hardwood forests. The fact that selection cutting worked well in Belgium carries no promise of success for it in Denmark; old selection cuttings prove that this method is poor silviculture. The trees become tall and spindly and are easily injured. The dangers to Danish hardwoods described by Muus are said to be imaginary rather than real.—*J. A. Larsen.*

2374. HELMS, JOHS. Proveniensenforsøg med Skovfyr. [Planting tests of (Weymouth) varieties, white pine.] Forst. Forsøgsv. Danmark 5: 353-371. Pl. 13, fig. 1, 1921.—Tests were begun in 1908 by planting 6 plots of white pine at Feldborg, Denmark. The stock was 2 years old from seed collected from older trees at Feldborg, Frederiksværk, Assebro, Rörvig in Denmark. Scotch and Norwegian stock was also used. Measurements in 1920 showed diversified growth and development. The trees of Norwegian origin grew very slowly and became badly diseased. The Frederiksværk variety also made very slow growth and is badly diseased. The rest grew rapidly, those of Scotch and Assebro origin best. The trees less exposed to the wind were less injured by reddening or killing of needles due to excessive evaporation when the ground is frozen. The lessened vitality of the plants from this cause renders them more liable to attack by *Tortrix buoliana* and *Lophodermium pinastri*. These varieties show also a marked difference in resistance to *Lophodermium* attack, and in the case of the Frederiksværk specimen a weakness in this respect seems inherited from the parent trees.—J. A. Larsen.

2375. HOFFMANN, F. Über die Grundlagen der Rechnungslegung in der Staatsforstverwaltung. [A basis for rendering accounts in state forest administration.] Centralbl. Gesam. Forstw. 46: 225-246. 1920.—The State provides that corporations make regular public statement of their accounts. This has not been done heretofore by the State in its own various business activities, though indications are that this will be necessary. A method is outlined in detail for rendering annual public statement of the finances of the State Forest Administration.—R. H. Weidman.

2376. HOLTEN, JUST. Laerk i Nordøstsjælland. [Larch in northeast Skålland, Denmark.] Tidsskr. Skogbruk 29: 92-148. Pl. 12, map 3. 1921.—The author discusses sites, climatic conditions, mixtures, and silvicultural treatment suitable for larch in Denmark. Both seeding and planting of larch have given good results, but it is not suitable for a general and extensive planting of pure forests in that it prefers slope land to bottomland.—Larch makes good growth and obtains good form in mixture with spruce, noble fir (edel gran), and beech; in mixture with these more tolerant trees it maintains the lead and is able to survive. This quality in larch enables under-planting or culture of tolerant trees which tend to preserve the site and increase the total yield.—J. A. Larsen.

2377. HÖNLINGER, II. Zum Methodenstreit in der forstlichen Statik. [Controversy over methods of forest statics.] Centralbl. Gesam. Forstw. 46: 100-111, 144-151. 1920.—This is chiefly a refutation of Neubauer's conception of the theory of highest interest on capital value of the forest (Reinertragslehre). Forest finance and mathematics of valuation formulae are gone into in detail to prove the author's position.—R. H. Weidman.

2378. HUTCHINSON, W. Forest fires—a national problem. Amer. Forestry 27: 675-683. 11 fig., 1 map. 1921.—From 1916 to 1920, inclusive, the total loss from forest fires in 45 states, including national forests, was more than \$85,000,000. The total number of forest fires in this period was 160,000, and 56,488,000 acres were burned over. Of these fires 80 per cent were caused by man, and were, therefore, preventable.—Chas. H. Otis.

2379. ILLICK, J. S. The American walnuts. Amer. Forestry 27: 699-704. 13 fig., 1 map. 1921.—This is a popular description of the black walnut (*Juglans nigra*) and butternut (*J. cinerea*) of the East, and of the California walnut (*J. californica*) and the southwestern walnut (*J. rupestris*) of the West, with notes on several exotic walnuts.—Chas. H. Otis.

2380. ILLICK, J. S. The maples. Amer. Forestry 28: 12-19. 14 fig. 1922.—This is a popular article.—Chas. H. Otis.

2381. ILLICK, J. S. The sycamores. Amer. Forestry 28: 145-150. 10 fig. 1922.—This is a popular description of *Platanus occidentalis*.—Chas. H. Otis.

2382. JÄPING. *Natürliche Verjüngung und damit Stetigkeit des Waldwesens auf der ganzen Waldfläche.* [Natural regeneration and resultant stability of forest life over the entire forest area.] *Zeitschr. Forst- u. Jagdw.* 53: 45-55. 1921.—The state forester discusses the silvicultural methods and problem of natural regeneration at Strassebersbach in his own district. He states that permanency of forest nature on the whole working area results in the retention of the highest soil productivity. The problem is to secure or keep the optimum conditions for the most suitable tree species and to retain this condition continuously in order to secure the highest wood production. As opposed to the even-aged stand the selection stand enables the best trees to develop full crowns, resulting also in greatest wood production quantitatively and qualitatively. In coniferous stands (spruce) the humus is characteristically "dead" and soil deterioration likely; this problem is met by judicious mixing with hardwood, the litter of which helps to secure quicker decomposition of the humus. In hardwoods, notably beech, the system adopted is the wide seed felling (Breitsamenschlag), a selection cutting over the compartment, while for spruce, strip-felling (Saumschlag) should be employed.—*J. Roesser.*

2383. JOHANNSEN, W. *Orienterende Forsøg med Opbevaring af Agern og Bøgeolden.* [Experiments in storing acorns and beech-nuts.] *Forst. Forsøgsv. Danmark* 5: 372-390. 1921.—Low temperature is necessary to keep acorns in a state capable of germinating. To what extent frost may be endured has not been tested. Storing at a temperature between 1 and 2°C. gave quite good results. Another necessary condition is access of air, otherwise the power of germination, even at the low temperature mentioned above, is lost in about 1 year. A solution of sublimate as a fungicide proved favorable; probably also copper sulphate could be used. Treatment with formalin solutions does not seem to be practical. It has been possible to keep acorns for more than 3 years, with, however, a gradually decreasing power of germination. From the surviving seed, a number of vigorous plants may grow up. Beechnuts are easily poisoned by the use of fungicides, but in a cold storage-room may otherwise keep fairly sound for 1 or 2 winters. After close sowing a rather marked correlation exists between the size attained by the young oak-trees during the 1st year and that attained after 10 year's growth, but their interdependence is far from being invariable.—*J. A. Larsen.*

2384. KORDVAHR. *Individualismus und Sozialismus in der Forstwirtschaft.* [Individualism and socialism in forest management.] *Zeitschr. Forst- u. Jagdw.* 53: 206-210. 1921.—Forest management can assist Germany considerably if the principles of highest net yield on forest capital are followed. The highest net yield from soil capital management is management for selfish interests,—the strict carrying out of individualistic principles. The highest net yield from forest capital management provides the greatest benefit of the whole and places the success of the whole over the gain of the individual.—*J. Roesser.*

2385. LAGERBERG, TORSTEN. *Mykologiens Betydelse för vår Skogsvård och Trävaruhantering.* [The importance of mycology in forestry and the handling of forest products.] *Skogsvårdsför. Tidskr.* 19: 102-114. 1921.—This is an address given before the forest high school.—*G. A. Pearson.*

2386. LEGAT, C. E. *The propagation of trees from seed.* *Jour. Dept. Agric. Union South Africa* 4: 161-172. *Pl.* 1-3. 1922.—Directions are given for rearing trees from seed, with particular reference to the pines, Eucalypts, and Acacias.—*E. M. Doidge.*

2387. LEININGEN-WESTERBURG. *Rauchschäden und Boden.* [Relation of smoke injury to forest soil.] *Centralbl. Gesam. Forstw.* 46: 119-144. 1920.—This article appeared also in the *Forstwiss. Centralbl.* [see *Bot. Absts.* 7, Entry 459].—*R. H. Weidman.*

2388. MARG, L. MATSSON. *Märgborrens Kronskadegörelse och dess Inverkan på Tallens Tillväxt.* [Damage to tree crowns by the pithborer and its influence upon increment.] *Meddel. Statens Skogsförsöksanst.* 18: 81-101. *Fig.* 1-2. 1921.—In Sweden the pithborer



(*Myelophilus piniperda*) destroys the young shoots of *Pinus sylvestris* and thus reduces the photosynthetic capacity of the crown. The reduction of leaf area is reflected in decreased growth. This investigation undertakes to establish a relationship between degree of crown injury and rate of diameter growth. A complication arises from the fact that infestations generally follow thinnings, and thus it is necessary to deal with 2 factors,—the stimulating effect of thinning and the retarding effect of crown damage. The per cent of crown injury is determined by ocular estimate checked by detailed analyses of leaf surface of a few type trees representing various degrees of infestation. Rate of diameter growth is determined by use of the accretion borer. The results show that rate of growth is in a general way inversely proportional to degree of infestation.—G. A. Pearson.

2389. MARTI, F. VON. *Verbauungen, Aufforstungen und Berasungen in den Einzugsgebieten der Wildbäche.* [Terracing, afforestation, and sodding for the control of irregular streams.] Schweiz. Zeitschr. Forstw. 72: 174-181. 1921.—Sod when packed down by snow or when frozen causes more surface run-off than terraces, and a record of terraces shows that they are adequate to equalize the run-off during heavy rainfall or rapid melting of snow. Cost of terracing is about equal to afforestation, and the terracing is more effective in controlling run-off. Where grazing is permitted among terracing the terraces should be protected by planting of suitable trees or shrubs. [See also Bot. Abstrs. 11, Entry 2366].—J. V. Hofmann.

2390. MARTIN, J. J. E. *Forêt de la Harth.* [The Harth forest.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 196-201. 1921.—The state forest of the Harth, in Lorraine, containing 14,000 hectares, has been under management for 150 years. Its native species comprise oak,  $\frac{3}{10}$ ; hornbeam,  $\frac{1}{10}$ ; and others,  $\frac{1}{10}$ . Linden is the best of the broad-leaf species. Scotch pine was planted extensively about 1840 and in 1900. It was first managed as coppice-under-standards, with a rotation of 35-40 years. In 1850 only 900 hectares remained in high forest. The working plan of 1860 provided for the conversion of coppice into broad-leaved high forest. Markings under this plan reserved 330-750 trees per hectare. Yields of 17 cubic m. of logs per hectare were realized. The plan of 1890 provided for the transformation into coniferous high forest. In 1910, German culture "condemned" the forest to the production of brush on a 30-year rotation, chiefly valuable for rabbit hunting, on 12,000 hectares. The yield under such a system would be 35,000 steres of small firewood and 5,000 steres of large firewood which, under existing economic conditions, is negligible.—J. Kittredge, Jr.

2391. MAXWELL, HU. *Wood for professional and scientific instruments.* Amer. Forestry 23: 151-158. 17 fig. 1922.

2392. MELL, C. D. *The importance of the jack tree.* Bull. Pan Amer. Union 51: 605-608. 1920.—The jackfruit tree, *Artocarpus integrifolia*, a native of the Indian Archipelago, is now widely grown throughout the tropics. Under normal conditions it may attain an age of several hundred years and measure 70-80 feet in height and over 3 feet in diameter near the base. The jackfruit tree as well as the breadfruit tree, *A. incisa*, readily recovers from the severest pruning or misuse. The fruits not required for human consumption are used for fattening cattle and sheep. Young branches are also used for feeding sheep and cattle, especially during dry seasons when fodder is scarce. When the thick bark is cut an abundance of a thick, white fluid exudes, which is used in India and Brazil as a rubber substitute. In Brazil both bark and leaves are used for medicinal purposes. The wood is very durable and valuable for carpentry, furniture, etc., though only the heartwood can be used for this purpose, the sapwood being soft and useless. The heartwood also contains a brilliant yellow dye, similar to that of the fustic tree to which the jack tree is closely related.—M. N. Levine.

2393. MELL, C. D. *The increasing importance of the jobo tree of tropical America.* Bull. Pan Amer. Union 51: 406-409. 1920.—*Spondias lutea* is known by a great many popular names in the regions and countries in which it grows. In Cuba, close to its northernmost limit of

growth, it is called "jobo" (hobo), in South Brazil it goes by the name of "caja" (cã chã). The jobo is a native of the Western Hemisphere and is now widely distributed throughout the tropics as a result of artificial propagation. In appearance this tree resembles the common ash. It belongs, however, to the cashew-nut family and is closely allied to the mango tree. The jobo is commonly used as a hedge plant and is propagated by cuttings. It is also good for fence posts, paper pulp, and, to a certain extent, for interior trimming. In Venezuela, Trinidad, and the Guianas, jobo wood is the only satisfactory match-stick material now in use. The wood is relatively soft and light and is generally regarded as one of the best woods known for the uses to which it is put. The fruit of the jobo, which is shaped like a plum and is frequently  $1\frac{1}{2}$  inches long, is used for making preserves and jelly, but mainly for fattening hogs.—*M. N. Levine.*

2394. MÜLLER. Kiefern Dauerwaldwirtschaft II. [Continuous management of pine. II.] *Zeitschr. Forst- u. Jagdw.* 53: 70-85. 1921.—The author discusses Trebeljahr's article [see Bot. Absts. 9, Entry 206] especially as to the system of continuous forest management. The new system attempts to secure a permanent forest condition (Waldwesen) over the entire area. The argument that the system can not be practiced on an extensive scale is based on the erroneous belief that the stand must be regenerated or reproduced naturally. The basic principles of the system are independent of the question concerning natural and artificial regeneration.—The forester must arrange a felling plan as similar as practicable to that of the continuous management system.—*J. Roesser.*

2395. NIRSCHL, J. VON. Über Niederländisch-Indiens Forsten und Wälder. [The forests of the Dutch East Indies.] *Schweiz. Zeitschr. Forstw.* 72: 225-232. 1921.—The area of the island of Java is 131,000 square km. and has a population of 34 million, or 200 persons per square km. About 46 per cent of the area is cultivated and 22 per cent forested. Although densely populated the local demand for forest products is very small, very little wood being used for fuel or dwellings. One of the chief uses of wood is for road construction. Teak is the principal species. The Indian oak is also an important commercial tree and reaches a height of 40 m. and a diameter of 100 cm. The practice of growing understory forests or cultivation is not feasible with teak because the species produces shoots 2 m. high the 1st season and the large leaves cast a heavy shade.—The east end of the island is much drier than the west, although the entire island has a dry season from May to October during the east monsoon winds. During the dry season the trees shed their leaves and have a resting period equivalent to a winter season.—The forest force consists of 93 persons divided as follows: forest administrator, chief inspector, 4 forest inspectors, 58 assistant foresters; forest improvement, 1 inspector, 19 assistant foresters; rubber products, 1 inspector, 3 assistant foresters; research, director, 5 assistant foresters. The outlying areas are manned by 1 inspector and 8 assistants. Including all forest laborers the force totals 1,421. The technical force should be increased to facilitate timber sales based on stumpage value and to insure better silvicultural methods.—*J. V. Hofmann.*

2396. OBERDIECK. Weder Bodenreinertrags- noch Waldreinertrags- sondern Bedarfs-Wirtschaft. [Not management of highest net return on soil capital or highest net return on forest capital but management based on demand and necessity.] *Zeitschr. Forst- u. Jagdw.* 53: 143-144. 1921.—The author is convinced that the chief factor in determining the rotation age must be demand (general or local) modified to some extent by concessions to the theory of management based on highest net return on forest capital. As a student of Borggreves he believes in a platform of intensive management with early, oft-recurring, adequately conducted thinnings, and with a thorough utilization of the light and value increment during the regeneration period.—*J. Roesser.*

2397. OSMASTON, B. B. Report on the forest administration of the Central Provinces [India] for the year 1918-19, together with the quinquennial review for the period ending with the year 1918-19. 22 + 6 + Lxxxv p. 1920.—This annual report covers in some detail all forest

operations. The area of forest has remained constant at 19,645 square miles, of which 16,545 are under approved working plans and 9,700 under fire protection. Considerable progress was made in construction of new roads, which results in an immediate increased income and greater utilization of forest products. Grazing and cutting trespasses apparently decreased in number over the 3-year average, due in part to incomplete reporting. A large part of the forest officers time was devoted to procuring hay for the army. The total number of stock grazed was 3,244,709, a decrease of 190,000 from the previous year. Over half of the decrease was in sheep and goats, which is not regarded as serious. A general seeding of katang bamboo occurred, the 1st since 1885. Cultural operations were carried out on 36,104 acres of forest, about 4,000 acres more than in the previous year. Some planting work is in progress. A total of 208,338 acres were cut-over, as compared to 178,399 in the year before. Practically all of these were classed as improvement fellings and coppice with standards. An increase in the value of minor products is noted. Most of the exploitation was under departmental direction. The net revenue of Rs 14,35,105 shows a decrease over the previous year. The year's administration was seriously hampered by extra activities occasioned by the war, the loan of personnel to the army, and to the heavy mortality among the permanent force due to the influenza epidemic. A comparative study of the 1st and last years of the 5-year period 1914-1919 is given. The usual detailed tabulations of areas of reserved lands, progress in forest settlements, demarcation of boundaries, improvements, utilization, income, etc., are appended.—*S. B. Shaw.*

2398. PACK, A. N. Seeds of international friendship. *Amer. Forestry* 28: 3-7. 12 fig. 1922.—This, the 2nd of a series, tells what was done by Great Britain, France, and Belgium with the American tree seed donated by the American Forestry Association to aid in restoring the forests destroyed by the war.—*Chas. H. Otis.*

2399. PACK, A. N. The vanishing trail. *Amer. Forestry* 28: 67-69. 5 fig. 1922.—This, the 3rd of a series of articles on European forestry conditions, describes the aftermath of cuttings in France by the Twentieth (Forestry) Regiment.—*Chas. H. Otis.*

2400. PAERELS, J. J. Een der belangrijkste boschproducten uit Indie. [One of the principal forest products of India.] *Cultura* 33: 316-320. 1921.—The production of benzoe resin from *Styrax* species, especially *S. Benzoin*, in the Dutch East Indies is considered. Important plantations are found in Palembang and Tapanoeli, Sumatra.—*J. C. Th. Uphof.*

2401. PAERELS, J. J. Eenige looi en verfstoffen uit Nederlandsch Indië. [Some tannin and dye stuffs from the Dutch East Indies.] *Cultura* 33: 270-277. 1921.—*Uncaria Gambir* produces gambir, an important tannin. It is obtained from the sediment after the leaves have been boiled. Cultivation in relation to soil and climate is easy. Rain of 3000 mm. per year is most favorable. There are 25,000 seed in 1 gm. Thick sowing is advised, with protection from the sun. Seed germinates in 14 days. Leaves are harvested after 1-2 years. Tannin from the mangrove species are obtained especially from *Rhizophora mucronata*, *R. conjugata*, *Bruguiera gymnorhiza*, *Carapa moluccensis*, and *C. obovata*. *Morinda citrifolia* produces a red dye used in coloring cloth in India. The bark of *Pelthophorum ferrugineum* is used in mixtures as a dye. The bark of *Acacia leucophloea* produces a tannin which is extensively used in Java for leather. *Cassia Fistula* produces Trenggocli bark which contains 9-15 per cent of tannin and makes excellent leather.—*J. C. Th. Uphof.*

2402. PAINE, V. B. Logging mahogany in tropical West Africa. *Amer. Forestry* 28: 131-141. 12 fig. 1922.—The author graphically describes methods by which logs are gathered in large quantities, brought to the shipping point by manual labor, and placed on board steamers.—*Chas. H. Otis.*

2403. PATTON, R. T. On the seasoning of hardwoods. *Proc. Roy. Soc. Victoria* 32: 350-353. 1920.—This supplements previous work on mountain ash (*Eucalyptus regnans*).

This species and messmate (*E. oblique*) were used. The results agree with those previously obtained. No acceleration of drying was observed after steaming. Shrinkage, however, was increased. The suddenly dried material gave least shrinkage but the ultimate rate of drying was not affected. Shrinkage in length was very small ( $\frac{1}{8}$  inch in 6 feet). For mountain ash radial shrinkage was 5 per cent and tangential 8 per cent. For messmate it was 6 and 8 per cent respectively. Boards 1 inch by 6 inches by 6 feet dried in 4 weeks during the summer to a 12 per cent moisture content.—*Eloise Gerry.*

2404. PETRINI, SVEN. Ett modifierat Avverknings-system—Schirmkeilschlag contra Wagnerblädning. [A modern system of cutting—shelterwedge-cutting vs. Wagner selection.] Skogsvårdsför. Tidskr. 19: 115-128. Fig. 1-2. 1921.—Eberhard's method which deals mainly with silver fir utilizes primarily 2 types of operations, thinning and soil preparation. Silver fir should be thinned often and lightly. Large openings encourage weeds and windfall. The interval between thinnings varies from 1 to 3 years. Frequent thinnings are especially important in the reproduction stage. Reproduction is introduced 20-25 years before the end of the rotation. The litter is removed, then the mineral soil is exposed in strips. At intervals 1-1½ m. in these strips, squares of ½ m. are hoed to a depth of 40 cm. Light must be introduced gradually in order to permit adaptation and to hold the weeds in check. Weeds can be controlled in this way because they endure less shade than the fir or spruce seedlings. Reproduction develops with the gradual introduction of light by thinning or light cutting until it is securely established. Up to this point all cuttings are classed as "preparatory;" later ones are designated "after cuttings." As in the case of preparatory cuttings, after cuttings should be frequent, preferably every year, until the stand has been converted into a young forest. The direction in which the regeneration proceeds over a unit depends upon 3 considerations,—prevailing wind direction, aspect of the site, and the direction in which the material is to be hauled. On account of danger from windfall, cutting usually proceeds from east to west, but on slopes this may be varied. Logs must not be skidded or hauled through a stand which has been restocked. In order to avoid suddenly opening up large spaces, the cutting areas take the form of wedges, the point of which is directed toward the west,—hence the name "Schirmkeilschlagbetrieb." Wedges are started at intervals of 80-120 m. The rate of cutting and regeneration can be regulated by increasing or decreasing the number and interval between wedges. At first, the wedges are very narrow and long, but as the cutting progresses they are widened until adjoining wedges coalesce. The method is especially adapted to silver fir because seedlings of this species may remain suppressed for 25 years, and when released spring up. Often the seedlings start in the virgin stand before cutting is begun, but they develop only as cutting proceeds.—*G. A. Pearson.*

2405. PODHORSKY, J. Die Korsische Kiefer, *Pinus laricio* var. *Poiretiana*. Eine forstliche Studie über ihr Verhalten in ihrer Heimat und ihre Eignung für den Anbau in Mittel-Europa. [The Corsican pine, *Pinus laricio* var. *Poiretiana*. A forest study of the requirements in its native habitat and its adaptability for introduction into central Europe.] Schweiz. Zeitschr. Forstw. 72: 171-174, 201-205, 232-238. 1 pl. 1921.—The variety is a native of the island of Corsica, where it still occurs in pure, well developed stands. Its range is from 900 to 1,700 m. above sea level, with *P. pinaster* from 500 to 900 m., *Fagus sylvatica* from 1,100 to 1,400 m., and *Abies pectinata* from 1,100 to 1,600 m. The climatic conditions are similar to the Alps of southern Switzerland and the soil is of the same granitic origin. The variety has produced better growth and larger trees in central Europe than in its native habitat. It endures shade very well, although in forest stands the trunks are cleared of branches. It has been the most successful tree that has been introduced into Central Europe. The soil and climatic conditions of southern Switzerland are more favorable than the sections where it has been grown successfully. Consequently it should prove to be a desirable species for use in protection forests in the high altitudes of Switzerland, and as a timber tree in the better localities.—*J. V. Hofmann.*

2406. PULFER. Über die Werthberechnung des Plenterwaldes. [Valuation of mature forests.] Schweiz. Zeitschr. Forstw. 72: 161-171. 1921.—There would be no difficulty in

determining values if land values and stand values could be separated. This is possible where each unit comprises a separate age class, but where the age classes occur in mixture, separate evaluations of land and stands of timber can not be made because the time of maturity of the mixed age classes can not be used as a factor. Diameter classes would form a better basis than age classes, since diameter and age are not consistent in a mixture of age classes. Diameter classes based on 20-30 cm., 35-50 cm., and over 55 cm. are suggested.—It is essential that valuation be based on actual yield rather than on yield based on silvicultural methods. Valuations are based on maximum land rentals, and variations from the maximum are correlated through the diameter classes and future yield.—Formulas are included for the determination of land valuation, rentals, stand values, normal and actual yield.—J. V. Hofmann.

2407. RAVE. *Die neuen Kontrollbuchanweisungen.* [New control book instructions.] Zeitschr. Forst- u. Jagdw. 52: 415-420. 1920.—This is a constructive critique of the new instructions issued to German foresters.—A. H. Graves.

2408. RECORD, S. J. Our tropical timber trade. Sci. Amer. 124: 444, 455. 5 fig. 1921.—The author briefly considers the sources, methods of logging, characteristics, and uses of the staple tropical trade woods.—Chas. H. Otis.

2409. RECORD, SAMUEL J. Boxwoods of commerce. Bull. Torrey Bot. Club 48: 297-306. Fig. 1. 1921.—A discussion is given of the species furnishing the boxwoods of commerce, with their geographic ranges and botanical affinities. The uses of the woods, the appearance of the logs and bark, a key to the woods, and a check-list of the common names are given.—P. A. Munz.

2410. ROIG, JUAN T. Sobre reformas en la reglamentación forestal. [About reforms in forest legislation.] Rev. Agric. Com. y Trab. [Cuba] 4: 566-567. 1921.—It is suggested that the cutting of young pines for poles and the topping of palms should be prohibited. Prohibition should be absolute with regard to ebony, sabin, and walnut, and limited with regard to trees which have not reached their maximum growth. A regulation of general character and application should be enforced by which trees will cut to a minimum diameter. Temporarily 4 or 5 classes of dimensions are suggested each with minimum diameters in accordance with the use to be made of the wood; i.e., sizes for poles, posts, rollers, cross ties, and boards. Notes on the habitat of the red mango are given.—G. R. Hoerner.

2411. ROTH, J. Maifrostschäden an Exoten. [May frost damage to exotics.] Centralbl. Gesam. Forstw. 46: 151-161. 1920.—A very severe May frost caused great damage to trees at Selmechanya, Hungary. The temperature reached  $-4^{\circ}\text{C}$ . Observations were made in plantations and arboretums where trees were 1-6 m. tall. Most exotic *Abies* suffered very little, especially *A. balsamea*, while the native *A. pectinata* as well as *A. grandis* suffered heavily. *Picea* with the exception of *P. Engelmanni* and *P. sitchensis* suffered very little. Contrary to accepted opinion, the "green" Douglas fir suffered slightly compared with the "gray" variety. With the exception of *Pinus flexilis* and *P. monticola*, pines suffered only slightly, with the following entirely undamaged: *P. aristata*, *P. Banksiana*, *P. contorta*, *P. Coulteri*, *P. inops*, *P. Jeffreyi*, *P. leukodermis*, *P. Murrayana*, *P. montana*, *P. ucinata*, *P. ponderosa*, *P. rigida*, *P. scopulorum*, and *P. Strobus*. *Taxodium distichum*, *Thuja gigantea*, *Tsuga canadensis*, and *T. heterophylla* were badly damaged; *Juniperus virginiana* and *Larocedrus decurrens* were undamaged; *Sequoia gigantea*, *Thuja occidentalis*, *Chamaecyparis Lawsoniana*, and *C. Nootkatensis* suffered only slightly. Late frost is not so dangerous to hardwoods as to conifers, as the former recover from frost readily. The unusual hardness of so many exotic pines is of great significance to Hungary, because among these are doubtless many that can be used successfully in afforesting the waste lands and sand dunes which are annually subject to late and early frosts.—R. H. Weidman.

2412. SAGE, H. The Royal palm. Amer. Forestry 28: 85-88. 5 fig. 1922.—This is a popular description of *Oreodoxa regia* as it grows in Florida.—Chas. H. Otis.

2413. SCHADELIN, W. VON. *Arbeiterfürsorge in der Forstwirtschaft*. [Provisions for forest workers.] Schweiz. Zeitschr. Forst. 72: 323-338. 1921.—The salary of the forester is stable and is based on ability rated by experience and examination. Although the salary is the principal compensation, there are several other benefits, viz: (1) natural provisions; (2) improvement of labor conditions; (3) sick and accident benefits; (4) retirement provisions for invalidism and old age. The provisions furnished should include use of timber for fuel, construction and repair at a low cost, whereas at present this is not allowed. Houses for the permanent locations and suitable temporary quarters should be provided; also sufficient ground for garden, orchard, and pasturage for at least 2 cows. Quarters for laborers, where the work is some distance from the residences, should be provided. Tools should be provided by the laborer since this insures better care of and satisfaction with the tools. Shelter and storage for tools should be provided.—*J. V. Hofmann*.

2414. SCHAEFFER, A. *Mécanisme de conversion—Taux de réalisation*. [Mechanism of conversion—rate of realization.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 201-205. 1921.—This is an attempt to answer the question as to what part of the volume of the forest principal can be exploited on a given forest area, with the certainty of again finding the initial volume at the time of returning for a future cut. Let  $V$  equal the volume before cutting,  $X$  the fractional part of the volume to be exploited,  $t$  the increment, and  $n$  the period in years. Then  $(V - Vx)(1 + t)^n = V$ . This is the formula for determining the future return on a given sum at compound interest on the condition that the capital be replaced in a certain number of years. Simplified, the formula becomes  $X = 1 - \frac{1}{(1 + t)^n}$ . Several examples are given of the application of the method.—*J. Kittredge, Jr.*

2415. SCHILLING. [Rev. of: RUBBER, KONRAD. *Die Bewegung der Holzpreise in Deutschland*. (The trend of forest product prices in Germany.) 124 p. J. Neuman: Neudamm, 1920.] Zeitschr. Forst- u. Jagdw. 53: 121-123. 1921.—This is a brief critique of various ideas from the book, which discusses the relation of prices and general economic conditions.—*J. Roesser*.

2416. STEPHAN. *Steigerung der Holzerzeugung Preussens durch Förderung der Oedlandsaufforstung, betrachtet vom volkswirtschaftlichen und finanztechnischen Standpunkt unter Hinweis auf die forstlichen Verhältnisse Englands*. [Increasing Prussia's wood production through furthering the afforestation of barren lands, considered from a politico-economic and finance-technical standpoint with reference to the forest conditions of England.] Zeitschr. Forst- u. Jagdw. 53: 25-38, 101-113. 1921.—England's problem is discussed, and the present (1917) forest policy stated. The afforestation of denuded lands in Prussia is primarily a matter of mine timber production. The increased rentability of barren-land afforestation rests upon the fact that the mine timber dealer, even in the remote sections of Prussia, can be considered a purchaser upon the steady increase in prices of and demand for mine timber, which has become so great as to necessitate importation. A plan in 2 parts is outlined by which afforestation may be carried out on an extensive scale: (1) a scheme of afforestation by the owners without state help, and (2) afforestation by the owner with state assistance consisting of district or province loans for which the state is surety. The 2nd instalment of the article considers the capitalization of areas to be afforested; liquidation of owner's indebtedness to state; duties of private land owners under the loaning system; conditions under which reduction in the liquidation quota because of insufficient yields may be considered; conditions under which private lands may be expropriated; and the general policy of the proposed scheme, which is to secure the greatest possible afforestation of barren lands and to prevent increased devastation, without introducing a system of direct state supervision over private forests, and with the minimum expenditure of state funds.—*J. Roesser*.

2417. STEPHENSON, H. T. *Trees in winter*. Amer. Forestry 28: 79-84. 19 fig. 1922.—This is a popular article.—*Chas. H. Otis*.

2418. TOWNY, J. W. Town forests. Amer. Forestry 28: 96, 113. 1922.—This address was delivered before the Massachusetts Forestry Association.—*Chas. H. Otis.*

2419. TRAGARDH, IVAR. Undersökningar öfver den Större Märgborren, dess Skadegörelse och Bekämpande. [Investigations of the large pithborer, damage and means of control.] Meddel. Statens Skogsforsöksanst. 18: 1-80. Fig. 1-27. 1921.—This insect (*Myelophalus piniperda*) attacks both the trunk and the crown of the Scotch pine (*Pinus sylvestris*) in Sweden. The larvae hatch from eggs laid in vertical galleries underneath the bark and work laterally, girdling the tree more or less completely. When the beetles emerge they bore into the 1st and 2nd year shoots and hollow out the interior, thus killing the portion above the point of attack. The shoots are attacked early in the summer by adults after oviposition, and later by the young brood. Injured or suppressed trees offer most favorable conditions for breeding because vigorous trees fill the galleries by excessive exudation of pitch. Repeated attacks on the crown may so reduce the vitality of a tree as to render its stem subject to attack. In virgin stands the insects are usually present only in small numbers because they find but few trees in which they can propagate. Complete eradication in such stands may usually be accomplished by removing all suppressed and injured trees. Epidemics often follow thinnings unless material over 3.5 cm. in diameter is removed or barked. Stems below this diameter are attacked, but the broods do not develop. After cutting, seed trees are subject to severe attack because great numbers of insects are reared in the stumps. Logs become breeding places only under certain conditions. Since the eggs are deposited prior to June 1, material cut during the summer can be left in the woods without danger. Material cut after September 1 and not exposed to the sun is likely to be attacked the following spring. Both logs and stumps can be rendered harmless as breeding places by peeling the bark.—*G. A. Pearson.*

2420. WEIBECKE. Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung. [East German pine forests. Their renewal and retention.] Zeitschr. Forst- u. Jagdw. 53: 5-23, 85-101, 145-154, 214-237. 1921.—The present intensive system of even-aged stands and clear-cutting is well established and the problem concerns itself with the best methods of carrying out the system. Clear-cutting in strips from north to south, which appears the most advisable, is discussed in detail, along with various silvicultural and logging requirements.—The 2nd installment considers the subject of soil preparation in pine stands for providing a desirable seed bed. The work is divided into 3 groups: (1) opening the soil, or merely removing or shaking free surface vegetation; (2) loosening and mixing soil and humus; (3) turning over the soil by deep plowing. The use of the plow is unnecessary, unprofitable, and harmful. Studies have shown that the best developed individuals in a stand are those with well-developed superficial root systems, not deeply penetrating ones. The work of soil preparation should be done in winter, not later than March. The desirability, choice, and application of cultural method in the use of implements are discussed. Their use is governed by the necessity of securing good but cheap labor. In the 3rd section, the history of planting pine in Germany is briefly reviewed, followed by an elaborate discussion of the physiology of the root system, the natural development of the root system of the pine, and root formations departing from the natural as occasioned by various cultural methods of planting and sowing. The conclusions are: Planting pine should be discontinued or at least every effort made to limit its use because its general effects are injurious. Best results are and will continue to be secured from natural regeneration on prepared and receptive forest soil, supplemented by cultivation over the entire area, or, at most, the preparation of shallow furrows with a careful mixing of as high an amount of humus as can be obtained in which pine seed of the best origin should be sparsely sown.—In the 4th installment, the author continues his treatise on cultural methods of treating forest soil. The complete turning over of the soil by deep plowing is usually harmful in the original forest. Any form of furrow culture is a compromise. It is best to keep a fresh, fertile soil over the entire regeneration area. Where furrows are plowed, a maximum distance of 1.3 is advised. The cultural manuring of plantations or crop rotation is not necessary on original forest soil. It is essential to keep the decomposing humus in use for wood production and not for the nourishment of sedges, heather, and weeds. In the 10th chapter,

the author discusses labor and costs of various operations, considering especially the amount of work required in various ways of turning the soil.—*J. Roesser.*

2421. WIBECK, EDVARD. Om Olika Skogsodlingsmetoders Förhållande till Uppfrysning-faran. [The relation of different methods of forest culture to damage by frost heaving.] Meddel. Statens Skogsförsöksanst. 17: 330-345. Fig. 1-3. 1919.—In 1916-18, experiments on the relation of deep and shallow cultivation to survival in planting and direct seeding were conducted in Norrland, Sweden. The seeding was in spots 16 × 16 inches or strips 4 × 16 inches. Under shallow cultivation merely the surface was cleared, exposing the mineral soil, while in deep cultivation the soil was loosened to a depth of 6 inches. Planting was in narrow holes made with a bar, or in wide holes. Contrary to the experience in southern Sweden the shallow spots and narrow holes gave the best results. Investigations showed that losses were due primarily to frost heaving, which is most severe in deep spots and wide holes. These effects were more noticeable on soil covered by lichens and herbaceous plants than on that covered with a deep layer of moss. The conclusion is that while cultivation generally favors the growth of seedlings, this advantage may be more than offset in Norrland by damage due to heaving. Heaving is favored by standing surface water and oscillating low temperatures, conditions which are characteristic of the extreme north and mountain regions.—*G. A. Pearson.*

2422. WIDEGREN, K. A. Transportbane-system Widegren. [The Widegren transportation system.] Skogsvårdsför. Tidskr. 19: 133-143. Fig. 1-9. 1921.—The article discusses the working of an experimental wooden railway system previously described, and also of 2 lines used in practical woods operations.—*G. A. Pearson.*

2423. WILBER, C. P. The foundation for forestry in New Jersey. Amer. Forestry 28: 20-24, 30. 6 fig. 1922.—This article deals largely with fire protection.—*Chas. H. Otis.*

2424. WILBRAND. Ideeler Waldwert. [Idealistic forest value.] Zeitschr. Forst- u. Jagdw. 53: 65-69. 1921.—A few recent cases have made it possible to judge to some extent the value placed upon the forest by the people in general, who place its esthetic value higher than its actual value in wood. The instance discussed is the selling of the Zehn Morgenwald, near Frankfort, for exploitation. Within 12 years the value of this tract had increased from 25,000 to 475,000 M., the increase expressing the change in value because of the esthetic and recreational use.—*J. Roesser.*

2425. WILBRAND. Kulturkosten. [Cultural expenses.] Zeitschr. Forst- u. Jagdw. 53: 210-214. 1921.—The cost of replacing a forest stand is closely connected with the revenue derived from removal of the final product, and the cost should come out of the final yield as does the labor cost of felling. It is not the forester's duty to cultivate as cheaply as possible as the soil rental adherents dictate, but he should bring the forest soil to the highest state of productivity as quickly as possible; and this can be done only by careful planting and cultivation. The fullest use of the forest can not be secured if the management is governed by the highest return on soil capital theory. Since it is necessary to bring cultures and plantations as rapidly as possible through the period of greatest danger in the life of the tree, artificial regeneration will usually be preferred.—*J. Roesser.*

2426. WILMOT, G. A. Matches and matchwood production. South African Jour. Indust. 4: 826-837. 10 fig. 1921.—This is a detailed account of the match-making industry of South Africa. The 2 factories described are Rosebank and Stamford Hill, where over 800 employees are engaged in the manufacture of boxed matches. A description of the whole process is given from the felling of the tree to the turning out of packed boxes. The main object of the article is to encourage more extensive afforestation. An immense amount of wood is imported from Russia, Canada, and the U. S. A., but there is no reason why all the timber required for this and many other industries should not be produced locally.—*S. M. Stent.*



2427. WIRZ-LUCHSINGER, VON. *Forstbotanische Beobachtungen aus dem Kanton Glarus. Die Arve.* [Forest botanical studies in the Canton of Glarus. The Cembra pine.] Schweiz. Zeitschr. Forstw. 72: 193-201. 1921.—Cembra pine (*Pinus cembra* L.) is scattered and has never formed forest stands. Individual specimens occur among *P. montana* Mill., and rhododendrons, willows, vaccinium, and *Aquilegia alpina* L. Cembra pine occurs at elevations up to 1,900 m. The erratic distribution and occurrence in small groups or individuals is attributed to seed distribution and planting by birds and mice, and in some localities to man. The seed is eagerly sought by birds and mice and is collected and cached even before maturity. —A distribution map of Cembra pine in the Canton of Glarus is included, and probable reasons for its occurrence in each locality are discussed.—J. V. Hofmann.

## GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 2072, 2092, 2100, 2101, 2102, 2104, 2178, 2188, 2202, 2262, 2280, 2374, 2528, 2563, 2567, 2570, 2580, 2617, 2627, 2630, 2635, 2638, 2661, 2760, 2780, 2798, 2853, 2876, 2893, 2899, 2923, 2997, 3019, 3033, 3082, 3093, 3104, 3202, 3203, 3204, 3208, 3214, 3241, 3242)

2428. ANONYMOUS. British roses and hybridity. *Nature* 108: 99-100. 1921.—The writer reviews briefly some of the facts presented by Harrison and Blackburn [see Bot. Absts., 9, Entry 738] on the hybridity of British roses and their cytology. He also considers the work of J. R. Matthews [New Phytol. 19: 153-171. 1920] and Cole [Bot. Gaz. 1917]. The question is raised as to the part which crossing plays in evolution. It is held that the occurrence of similar microgenes in different species of roses is due to parallel mutations and is not an indication of orthogenesis, as Harrison believes.—A. C. Fraser.

2429. ANONYMOUS. [German rev. of: BAUR, ERWIN. *Die Grundprinzipien der rein naturwissenschaftlichen Biologie und ihre Anwendung in der Physiologie und Pathologie.* (The foundation principles of pure scientific biology and their application in physiology and pathology.) Roux's Vorträge u. Aufsätze 26. 75 p. 1920.] *Arch. Entwicklungsmech.* 50: 348. 1922.

2430. ANONYMOUS. [German rev. of: DÜRKEN, BERNHARD. *Einführung in die Experimentalzoologie.* (Introduction to experimental zoology.) 16 X 23 cm., x + 440 p., 224 fig. Julius Springer: Berlin, 1919.] *Arch. Entwicklungsmech.* 50: 348-351. 1921.

2431. ANONYMOUS. [German rev. of: DÜRKEN, BERNHARD, and HANS SALFELD. *Die Phylogenese, Fragestellungen zu ihrer exakten Erforschung.* (Phylogenesis, outline of questions for its exact investigation.) 59 p. Gebrüder Borntraeger: Berlin, 1921.] *Anat. Anzeiger* 55: 189-190. 1922.

2432. ANONYMOUS. [German rev. of: KAMMERER, PAUL. *Das Gesetz der Serie. Eine Lehre von den Wiederholungen im Lebens- und im Weltgeschehen.* (The law of series. A doctrine of the repetitions in life and world phenomena.) 17 X 23 cm., 488 p., 8 pl., 26 fig. Deutsche Verland-Anstalt: Stuttgart-Berlin, 1919.] *Arch. Entwicklungsmech.* 50: 348-346. 1922.

2433. ANONYMOUS. [German rev. of: LENZ, FRITZ. *Grundriss der menschlichen Erblichkeitslehre und Rassenhygiene. II.* (Fundamentals of human genetics and eugenics II.) J. F. Lehmanns: Munich, 1921.] *Anat. Anzeiger* 55: 223. 1922.

2434. ANONYMOUS. [German rev. of: MORGAN, T. H. *Die stoffliche Grundlage der Vererbung.* (The material basis of heredity.) Translation by Nachtsheim, H. 201 p., 118 fig. Gebrüder Borntraeger: Berlin, 1921.] *Anat. Anzeiger* 55: 190. 1922.

2435. ANONYMOUS. **Improvement of the race.** [Rev. of: POPENOE, PAUL, AND R. H. JOHNSON. *Applied eugenics*. 14 × 20 cm., xii + 459 p., 46 fig. Macmillan Co.: New York and London, 1918 (see Bot. Absts. 3, Entry 279).] *Nature* 106: 752-753. 1921.

2436. ANTONIUS, O. [German rev. of: ADAMETZ, LEOPOLD. *Herkunft und Wanderungen der Hamiten, erschlossen aus ihren Haustierrassen*. (Origin and wanderings of the Hamites determined from their domestic animals.) Osten u. Orient 2: 109 p. 24 pl., 44 fig. 1920.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 28: 247-248. 1922.

2437. BANNIER, J. P. [Dutch rev. of: HAGEDOORN, AREND L., AND A. C. HAGEDOORN-VORSTHEUVEL LA BRAND. *The relative value of the processes causing evolution*. 14 × 24 cm., 224 p., 20 fig. Martinus Nijhoff: The Hague, 1921.] *Genetica* 4: 87-95. 1922.

2438. BATESON, W. **The determination of sex.** [Rev. of: GOLDSCHMIDT, RICHARD. *Mechanismus und Physiologie der Geschlechtsbestimmung*. (Mechanism and physiology of sex determination.) viii + 251 p. Gebrüder Borntraeger: Berlin, 1920.] *Nature* 106: 719-721. 1921.

2439. BAYLISS, W. M. **The hormone theory of heredity.** [Rev. of: CUNNINGHAM, J. T. *Hormones and heredity: A discussion of the evolution of adaptations and the evolution of species*. xx + 248 p., 3 pl. Constable and Co.: London, 1921.] *Nature* 109: 35-37. 1922.

2440. BOTTAZZI, FILIPPO. [Rev. of: STEINACH, E. *Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse*. (Rejuvenation through experimental revitalization of the senile sex glands.) 68 p., 9 pl. Julius Springer: Berlin, 1920.] *Scientia* 31: 246-248. 1922.

2441. BRIDGES, CALVIN B. **Genetical and cytological proof of non-disjunction of the fourth chromosome of *Drosophila melanogaster*.** *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 188-192. 1 fig. 1921.—The author's previous work demonstrated that the sex (or 1st) chromosome carried the sex-linked genes and the present study establishes a similar relation for 1 of the autosomes, i.e., the small chromosome pair for which only 2 genes are known. A mutant type called "diminished" gave genetic results indicating deficiency of the 4th chromosome. Cytological study of dividing cells in such individuals showed clearly that only 1 small chromosome was present. Triploid 4th-chromosome individuals have also occurred secondarily. The haploid nature of diminished has made it possible to determine the percentage of crossing over between the 2 4th-chromosome genes, even though the double recessive stock has not yet been secured. Female flies heterozygous for both these characters are crossed with diminished males, and the diminished offspring show any crossovers which have occurred. The value is stated to be "the equivalent of  $0.86 \pm 0.14$  per cent of crossing over." Text figures of the haploid 4th-chromosome metaphase plates appear in this paper, but detailed genetic data are not given.—*H. H. Plough*.

2442. CARRARA, M. [French rev. of: CONKLIN, E. G. *L'hérédité et le milieu. Leur rôle dans le développement de l'homme*. (Heredity and environment. Their rôle in the development of man.) 16 mo., 295 p., 43 fig. Flammarion: Paris, 1920 (see Bot. Absts. 4, Entry 547).] *Scientia* 31: 318-319. 1922.

2443. CASTLE, W. E. **A new type of inheritance.** *Science* 53: 339-342. 1921.—The paper has reference to investigations of J. Schmidt on "the millions fish," *Lebistes reticulatus*, [see Bot. Absts. 10, Entry 1748] and presents a "hypothetical outline of the evolution of sex-linked inheritance."—Schmidt discovered 2 races of *Lebistes*: one in which only males have a conspicuous black spot on the dorsal fin; the other in which the spot is wanting in both males and females. Spotted male begets sons all like himself, regardless of mother's ancestry. The spot can not be inherited through females of either race. Hence the spot is strictly sex-limited

in the 1st-mentioned race, and the sperm that are "male-determining" must be the "sole vehicle of its transmission." "It therefore has, as Schmidt points out, exactly the distribution of a Y chromosome, and he suggests that a Y chromosome may be the vehicle of transmission \* \* \*."—Castle recalls his earlier (1909) suggestion that the Y chromosome afforded a suitable vehicle for transmitting the sex characters of males and renews the suggestion that "the Y chromosome may contain the clew to the explanation of that \* \* \* type of sex-linked inheritance found in *Abraxas* and \* \* \* in poultry." He then discusses the rôle of X and Y chromosomes in sex determination and suggests a possible origin of *Drosophila*, poultry, and *Lebistes* types of sex-linked inheritance. With reference to the latter he says: "If in the *Drosophila* type of inheritance, Y should come to contain genes, these would be handed on from father to son, without ever entering a female zygote (*Lebistes* type). In the poultry type of sex-linked inheritance, Y would not afford a suitable mechanism for this one-sided inheritance, since Y there passes into females. Hence the *Lebistes* type must be a further evolution of the *Drosophila* and human type, not of the poultry type."—A. W. Bellamy.

2444. COLLINS, G. N. Teosinte in Mexico. Jour. Heredity 12: 338-350. *Frontispiece and pl. 1-7*. 1921.—Results are reported of an expedition to Mexico made by the author and J. H. Kempton to study the wild forms of teosinte (*Euchlaena mexicana* Schrad.) and the natural hybrids of teosinte with maize. Annual teosinte was found in the States of Durango and of Mexico, and a perennial form in Jalisco. Although teosinte and maize were growing in close proximity there was little evidence of natural hybridization. Since the annual forms of teosinte occupy a position between perennial teosinte and maize and since at least 1 form of annual teosinte is distinguished from the others by characters which it shares with the maize of the region in which it grows, it is suggested that the annual types of teosinte may have originated from hybrids between perennial teosinte and maize. Living plants were introduced into the U. S. A. for hybridization studies.—G. N. Collins.

2445. CUMMINGS, M. B. First 15 years of a 40-variety apple orchard: Apple scion selection. Vermont Agric. Exp. Sta. Bull. 221. 58 p., 4 pl., 5 fig. 1921.—In 1904 a 40-variety orchard was set for the purpose of making a comparative study of growth, blossoming periods, yields, winter injury, and storage endurance. Data and observations reported cover 15 years.—The orchard was given clean cultivation with cover crops, was moderately pruned, and sprayed 3 times annually. Comparative growths of varieties were determined by annual linear growth of twigs, calibration of trunk diameters, and measurement of horizontal and vertical diameters of heads. Blossom data, dates and average duration of bloom, were secured for 6 seasons. The average blossoming period in Burlington, Vermont, extends over 14 days, most varieties overlapping sufficiently to allow interpollination.—Winter injury during 1917-18 and 1918-19 was severe on Baldwin, Fallawater, Sutton, Twenty Ounce, Spitzenburg, and King, and less severe on Arctic and Rhode Island Greening, but scarcely affected other varieties under observation. Annual yield data to the end of the 15-year period include average total weight and number of apples per tree for Longfield, Yellow Transparent, Scott, Oldenburg, Fameuse, Cooper, Gravenstein, Roman Stein, Dwarf Baldwin, McIntosh, Northern Spy, and Yellow Bellflower.—Storage endurance in a basement room under recorded conditions of temperature and humidity was studied for 3 seasons. During much of the time temperatures approximated 40°F. and humidity about 75. The 3-year average storage period varied from 38 days for Red Astrachan and 154 for St. Lawrence, to 297 for Ben Davis, and 224 for Mann. Baldwin averaged 281 days, McIntosh 224, Wealthy 219, Rhode Island Greening 241, Fameuse 226, North Western Greening 236. In general the progress of decay was slow and the shrinkage small.—In 1910 an experiment was started to test the relative merits of scions derived from high- and low-yielding apple trees. Scions derived from productive trees have done no better, in fact to date have done scarcely as well, as those from unproductive trees. Another 10-year period must elapse before sufficient data are accumulated to warrant conclusions as to the basic question involved. However, those in hand clearly do not afford affirmative support to the scion selection idea.—C. S. Crandall.

2446. DART, RAYMOND A. [Rev. of: CONKLIN, E. G. *The direction of human evolution.* xiii + 247 p., Oxford University Press: London, 1921.] *Sci. Prog.* 16: 678-679. 1922.

2447. DUNLAP, KNIGHT. *Personal beauty and racial betterment.* 95 p. C. V. Mosby & Co.: St. Louis, 1920.—Beauty is the outward, visible sign of a multitude of excellencies which count in the conservation of the race. Its conditions are in part, negative; in part, positive. Among the former are absence of deformity or disease, and the latter, character of the skin and hair, muscular tonicity, and poise. Of these, poise is of chief importance as an index of the mental and spiritual potentialities of its owner. The highest types of activity are reactions in which the nervous discharge over a vast network of routes is integrated for the moment into a single function of a complex system. This high level of integration, characteristic of the specialist, does not necessarily imply the ability to maintain an efficient level under the various situations to be faced in daily life. The balance of preference for parenthood should go to the more generally integrated stock, those possessing poise, from which individuals of specific integration type may be developed as offshoots. Since human beauty is a sign of fitness for parenthood, the problem of race conservation becomes the problem of the conservation of beauty. Civilization has interfered with the conservation of desirable human qualities by setting sexual values which conflict with those of beauty, and which obscure or override them. The advantage conferred by wealth frequently obscures undesirability, so that men and women who are not fit co-parents are sought after and married. Again, the more beautiful a woman, other conditions being equal, the greater her chance of making a wealthy match; the wealthier the match, under present conditions, the less the probability of her bearing children. Thus beauty becomes an anti-eugenic force of great magnitude. The needs for racial conservation are chiefly two: (1) To insure that marriages shall be made on the basis of mutual attractiveness alone, excluding all interference of national, family, social, religious or economic motives. (2) To take care that the unions of the most fit shall be relatively more fruitful than those of the less fit. The most serious check to the reproduction of the better classes is economic and has its roots in the reduction of means of subsistence of the human race, which in turn is traceable to the unrestricted reproduction of the undesirable classes of the population. The most obvious relief measure to be found lies in decreasing the birth-rate of these classes. Although the birth-control propaganda has heretofore encountered many obstacles, many of these are likely to be removed when the social and industrial crises now threatening have become actualities. In addition to the economic checks, there are psycho-sociological checks that operate selectively against the more beautiful women as mothers of the race to be. Among these are the drawing of so many into the ranks of public entertainers and of hetairae. By the latter term are meant those who sell themselves in legalized marriage to the highest bidder for the sake of the ease and social distinction which wealth bestows. The practice also operates anti-eugenically as regards men, since the characteristics vital to the race are more and more overshadowed by the ability to provide luxuriously for a wife. War, with its evils, brought a freshening of the sexual interest of women and lent its support to a tendency to select for the race. The male personal qualities which preserve the stock once more came into the prominence they had in less civilized societies and of which modern industrialism had robbed them. The unsettling of social restraints also made for overthrow of accepted standards, and whether the total effect will be for good or ill remains to be seen. Laws, customs, and economic conditions should be so shaped as to facilitate race conservation. This shaping, and the still greater work of motivation, is to be accomplished through education and publicity directed in the service of ideals kept continually vitalized; ideals of personal values, among which beauty, in its comprehensive mental and physical interpretation, is paramount.—*W. E. Key.*

2448. DURHAM, G. B. *Inheritance of belting spotting in cattle and swine.* *Amer. Nat.* 55: 476-477. 1921.—A brief review is made of inheritance of belting in cattle and swine. The evidence supports the theory that belting spotting is due to heterozygous condition (*Ss*) for spotting. A bibliography is given.—*E. Roberts.*

2449. DÜRKEN, BERNHARD. *Korrelation und Artbegriff*. [Correlation and species concept.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 27: 27-47. 1921.—Species relationships should be based on genotypic and not phenotypic differences. The use of fossil material for species classification is discussed. Fossil material shows combinations of characters but not correlations between characters. Too much volition enters into the study of character combinations and a study of correlations between characters is necessary for species classification.—*Hally J. Sax.*

2450. EGGELING, H. VON. [German rev. of: BAUR, ERWIN, EUGEN FISCHER, UND FRITZ LENZ. *Grundriss der menschlichen Erblchkeitslehre und Rassenhygiene. I. Menschliche Erblchkeitslehre.* (Fundamentals of human genetics and race hygiene. I. Human genetics.) 16 × 22 cm., 305 p., 66 fig. J. F. Lehmann: Munich, 1921.] *Anat. Anzeiger* 55: 144. 1922.

2451. FAWCETT, FREDERICK. *Heredity and acquired characters*. *Nature* 106: 693-694. 1921.—The author reports observations in Malabar that the ratio of arm length to body height in castes which had been rowers and tree climbers for perhaps thousands of years is not greater than ordinary.—*O. A. Stevens.*

2452. FEHLINGER, H. [German rev. of: HIRSCHFELD, M. *Sexuelle Zwischenstufen. Das männliche Weib und der weibliche Mann.* (Sex intergrades. The masculine woman and the feminine man.) 279 p., 7 pl. Marcus & Weber: Bonn, 1918.] *Arch. Rass.- u. Ges. Biol.* 14: 67-68. 1922.

2453. FRANZ, V. [German rev. of: PLATE L. *Vererbung Studien an Mäusen.* (Inheritance studies on mice.) *Arch. Entwicklungsmech.* 44: 291-336. 5 fig. 1918 (see Bot. Absts. 3, Entry 658).] *Arch. Rass.- u. Ges. Biol.* 14: 64-65. 1922.

2454. FROST, HOWARD B. An apparent case of somatic segregation involving two linked factors. *Amer. Nat.* 55: 461-464. 1921.—A plant was observed (in a culture of *Matthiola annua*) of which the apical portion showed 2 linked recessive characters (stout branches, *s'*, and double flowers, *d*, but which was otherwise slender, *S'*, and single, *D*, and of composition  $\frac{S'D}{s'd}$ ). The parts of the plant displaying the recessive characters arose, the author believes, as the result of a mitotic division which resulted in one daughter cell receiving both halves of the chromosome containing *s'd* but neither half of the chromosome containing *S'D*. The author also suggests that the result may have been due to a deficiency mutation, or to a duplication. The linkage relationships indicate that point mutations were not involved.—*E. Allenburg.*

2455. FRUWIRTH, C. [German rev. of: WITTE, H. *Über weibliche Sterilität beim Timotheegras (Phleum pratense L.) und ihre Erblchkeit.* (On female sterility in timothy (Phleum pratense L.) and its inheritance.) *Svensk Bot. Tidsskr.* 13: 32-43. 2 fig. 1919 (see Bot. Absts. 3, Entry 671).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 28: 248. 1922.

2456. GRAEVENITZ, LUISE VON. *Kartoffelkreuzungen*. [Potato crosses.] *Landw. Jahrb.* 55: 753-815. 1921.—A detailed account is given of potato crosses made in 1916-1918, with discussion of methods. Fifty pages are devoted to tables of descriptions of every cross, giving number of tubers, weight, form, color, skin, flesh, and eyes.—*A. J. Pieters.*

2457. HAASE-BESSELL, GERTRAUD. *Digitalis Studien II.* [Digitalis studies II.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 27: 1-26. 1921.—In this continuation of the author's previous studies of characters of *Digitalis* hybrids and their cytological behavior, the following interspecific hybrids were secured: *purpurea-ambigua*, *lutea-micrantha*, *lanata-micrantha*, *lanata-lutea*, *lanata-ambigua*, and *purpurea-lanata*. In general the hybrids were intermediate between the parents, although habit of *purpurea* was to a certain extent dominant over that of

*lutea* and *lanata*, and that of *lutea* and *micrantha* over that of *lanata*. All true hybrids were sterile. In 4 cases false hybrids resembling the mother species were secured as well as true intermediate hybrids.—Chromosome counts of species showed that *lutea* had 48 chromosomes (haploid), other species 24. Cytological studies disclosed marked differences in behavior in maturation divisions. *Lutea-micrantha* (48 + 24 chromosomes) exhibited 36 conjugating pairs of chromosomes in diakinesis; *lanata-micrantha* (24 + 24) formed 24 pairs; *lanata-lutea* (24 + 48) showed a variable number of pairs of chromosomes, with formation of loose double series of chromosomes in the equatorial plate; *purpurea-lutea* (24 + 48) exhibited no conjugation in diakinesis; and *purpurea-ambigua* (24 + 24) formed 24 pairs of chromosomes. Multipolar spindles were frequently observed and "Nebenkerne" were often formed from chromosomes not drawn back to the poles of the spindle. The 2nd maturation division was regular and occurred simultaneously in "Nebenkerne" and regular daughter nuclei. Degeneration of germ cells occurred at subsequent stages. A *gigas*-like *lanata-lutea* plant, "E," was found to have 48 large double chromosomes plus a variable number of pairs of smaller chromosomes.—The author rejects the hypothesis that sterility depends upon repulsion of specifically different chromosomes; for even in extreme cases where no pairing was demonstrable in diakinesis typical synapsis occurred and double threads appeared in the succeeding stage. He favors a physico-chemical interpretation dependent upon differences in ability of chromatin-building enzymes in hybrids to build up from nucleolar material chromatin necessary for formation of chromosomes of diakinesis. Chromosomes in diakinesis may in consequence be immature or unripe and not in proper physical condition for conjugation. In developing the hypothesis the author discusses particularly Federley's work on *Pygaera*, Rosenberg's on *Hieracium*, and Bailey's on *Triticum-Aegilops* hybrids. The cytological work on the false hybrids has not been completed but the author rejects the hypotheses of induced apogamy, parthenogenesis, or pseudogamy as explanations. He assumes that they result from fertilization and suggests that possibly relative ripeness of germ cells determines whether a true or false hybrid will be produced. In the *gigas*-like plant "E" of the *lanata-lutea* series, the 48 large double chromosomes are assumed to result from the stimulation of activity of *lutea* chromatin-building enzymes at the expense of *lanata* chromosomes, which remain small and variable in number. Stimulation leads to premature splitting of chromosomes and possibly to formation of germ cells with normal somatic number of chromosomes. In this connection the author discusses the general significance of *gigas* phenomena in plants.—R. E. Clausen.

2458. HAECKER, V. Die Annahme einer erblichen Übertragung körperlicher Kriegsschäden. [The supposition of a hereditary transmission of physical war injuries.] Arch. Frauenk. u. Eugenik. 4: 1-15. 1919.—The author reviews at length arguments for and against the inheritance of acquired characters, and concludes that biological evidence is against the possibility of inheritance of war injuries. So far as observed, the average weight and vitality of infants born in 1916 showed a favorable increase. If the effects of malnutrition, exhaustion, and psychic disturbances could lead to racial degeneration, then it is believed Germany could not have survived the devastations of the Thirty Years War. Even should such harmful effects supervene, and this is not proved, "observed facts as well as biological considerations point to an inherent power of regeneration of the germ-plasm." The basis of this is not known, but it may reside in the intercrossing of strains.—W. E. Key.

2459. HELLER, H. H. Mutations in the genus *Nicolaierillus* (B. tetani). VIII. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 33-49. 6 fig. 1922.—Tetanus strains mutate readily in favorable protein media; the mutation of non-proteolytic anaerobes is much less frequent. This is found to be in accordance with the hypothesis that proteolytic anaerobes are the products of a more far-reaching evolution than the non-proteolytic forms. The importance of the mutations from the systematic, biochemical, and therapeutic points of view are discussed and technical suggestions made.—Selman A. Waksman.

2460. HELLER, H. H. Notes on the genus *Nicolaierillus* (B. tetani). VII. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 18-32. 2 fig. 1922.—A study is made of the mutation of tetanus strains as shown by the colony formation.—Selman A. Waksman.

2461. HERWERDEN, M. A. VAN. [Dutch rev. of: GEROULD, JOHN H. *Blue-green caterpillars: The origin and ecology of a mutation in hemolymph color in Colias (Eurymys) Philodice*. Jour. Exp. Zool. 34: 385-415. 1 pl. 1921 (see Bot. Absts. 11, Entry 1348).] *Genetica* 4: 81-82. 1922.

2462. HUNT, R. E. *Selecting Holstein-Friesian sires for high yearly production*. Jour. Heredity 12: 368-384. Fig. 19-25. 1921.—A study is reported of the Holstein-Friesian herd of cattle with the object of discovering the high-producing lines. All sires of cows with a record of 600 pounds of butterfat in a year are listed and classified according to the records of their daughters.—*Sewall Wright*.

2463. HUXLEY, JULIAN S. *Some implications of the chromosome theory of heredity*. Sci. Prog. 16: 235-250. 1921.—This is a statement of the present status of the chromosome theory of heredity, together with some of its obvious implications for the general problem of evolution on the one hand and of differentiation on the other. The facts of Mendelian inheritance are first given and it is stated as a working hypothesis "that the hereditary constitution of an organism consists of a large number of genes, Mendelian unit factors." The evidence that the chromosomes are the bearers of the genes is then briefly reviewed, and it is indicated that the differentiation of the ovum both before and after fertilization may be thought of as under the influence of these chromosomal units. These "factors of heredity. . . . constitute a mechanism which has two distinct functions. . . . The first function is to act as the self-regulating machinery of heredity; the second, in conjunction with sexual reproduction, is to allow the multiplication and more especially the recombination of variations, so as to afford the possibility of evolutionary change." The question of the mutation of single genes is discussed, and it is suggested that "it is by the combination of many small (but definite and discontinuous) constitutional changes that evolution proceeds." The presence and absence is being abandoned in favor of the view that mutation is a change in a gene, and the independence of the genes in heredity permits of all possible recombinations. Selection has thus plenty of material on which to work in establishing new species. Much evidence is quoted in support of this view, most of which is explainable only on Mendelian grounds. It is indicated that "Mendelian recombination produces extreme variations rarely, but a vast number of combinations which exhibit but a few differences from the average." From another point of view, however, it appears that apart from possible mutations the gene-constitution is a unit-complex which, being self-perpetuating, is "adapted for the task of acting as the self-regulator of heredity; for passing on unchanged from generation to generation that constitution which in interaction with environment gives the adult organism; and therefore for *resisting* the very type of effect which the Lamarckians consider to be operative in evolution."—The other essential side of heredity, that of the differentiation of the adult organism from the fertilized egg, has been considered to be impossible of explanation on the basis of the chromosome theory since all cells receive the full gene-complex. Given, however, the initial polarity and pre-localization of substance in the egg (which seems to be produced by interaction of gene-complex with cytoplasm), then, when the egg divides, the same gene-complex will be located in different environmental regions and will give different end-products. A formal explanation of differentiation thus becomes possible. "The development of an organism is a series of states of equilibrium usually of increasing complexity, none fully balanced, but each resolving itself automatically into the next. Finally the adult stage is reached, in which relative stability is assured, either by the narrow limits of the environment or by elaborate regulatory mechanisms." The chromosome theory in its present state is based on experimental evidence. While it may require correction "it is the only hypothesis which allows us to synthesize so many distinct sets of facts in one conception."—*H. H. Plough*.

2464. JEFFREY, E. C. *The geographical distribution of hybrids*. Science 54: 517. 1921.—The author criticizes Fernald and supports Kerner's view that natural hybrids may occur beyond the geographic range of one or both parents.—*Merle C. Coulter*.

2465. JONES, D. F. Collins's remarks on the vigor of first-generation hybrids. *Amer. Nat.* 55: 457-461. 1921.—Jones's explanation of heterosis on the basis of dominance of linked factors recently received the following comments from Collins [see *Bot. Absts.* 8, Entry 1903]: (1) With many factors involved, skew curve of theoretical distribution (in  $F_2$ ) of independent dominant factors (governing heterosis) approaches type of normal curve; linkage assumption being unnecessary. (2) With many independent factors involved, the possibility of recombining all in a single individual (homozygous for maximum hybrid vigor) is so remote that non-appearance of such individuals in experimental work is no proof that they cannot be obtained; linkage assumption again is unnecessary. (3) Heterosis should be regarded as due to suppression of deleterious recessives rather than combination of favorable dominants.—Jones now replies as follows: (1) Where the range of segregating generations with small numbers nearly equals the combined range of the original races as exhibited by characters which show heterosis, the number of main factors governing expression of heterosis cannot be large. Assuming dominance without linkage, such distributions should show right-hand skewness, which they never do. (2) Experimental work may have been inadequate in magnitude to disprove possibility of recombining all desirable growth factors in 1 homozygous individual (assuming no linkage), but other evidence is available. Natural selection in isolated populations of cultivated plants has not brought about noticeable stability. Corn varieties, probably grown 50 years without admixture, when selfed show as rapid reduction in vigor as other varieties which are recent products of hybridization. (3) Suppression of deleterious factors is inadequate to account for heterosis when other forms than *Zea* and *Drosophila* are considered. Many cases are known where crossing parents, both "normal, vigorous, and perfectly capable of maintaining themselves," has yielded markedly superior  $F_1$  hybrids. The author emphasizes the practical importance of realizing that the act of inbreeding does not produce weakened individuals but is merely a sorting out process. "These less vigorous individuals of no apparent value have potentially great value."—*Merle C. Coulter*.

2466. KINDRED, JAMES ERNEST. Inheritance of a pit in the skin of the left ear. *Jour. Heredity* 12: 366-367. *Fig. 17-18*. 1921.—A small pit "in the skin of the proximal end" of the upper part of the left ear is shown to have been inherited through at least 4 generations by individuals of both sexes. As the pit is transmitted by individuals not possessing it, and conversely it is termed a case of incomplete dominance.—*Oliver Olson*.

2467. KNIEP, H. [German rev. of: BLAKESLEE, ALBERT F., J. LINCOLN CARTLEDGE, AND DONALD S. WELCH. *Sexual dimorphism in Cunninghamella*. *Bot. Gaz.* 72: 185-219. 1 fig. 1921.] *Zeitschr. Bot.* 14: 326-327. 1922.

2468. KNIEP, H. [German rev. of: MEISENHEIMER, J. *Geschlecht und Geschlechter im Tierreiche. I. Die natürlichen Beziehungen*. (Sex and the sexes in the animal kingdom. I. The natural relations.) *xiv + 896 p., 737 fig.* Gustav Fischer: Jena, 1921.] *Zeitschr. Bot.* 14: 299-300. 1922.

2469. KNIGHT, M. M., IYA L. PETERS, AND PHYLLIS BLANCHARD. *Taboo and genetics*. 301 p. Moffat, Yard and Co.: New York, 1920. Part I. The new biology and the sex problem in society. Sex is defined in terms of internal secretions and evidence for dual basis of sex drawn from free martin cattle and partial reversal of sex in human species. Sex differences are quantitative and conditioned on the effect of the 2 diverse chemical systems on the life cycle. Most significant differences from the standpoint of group survival are: (1) less active and more uneven metabolism in woman, (2) less physical strength and inferior adaptability to some kinds of work; and (3) specialization of the female body and metabolism to furnish intramammary environment and lactation for young. The problem of human reproduction and group survival thus becomes a problem of group adjustment to environment which this specialization entails.—Part II. The institutionalized sex taboo. The primitive social control necessary to survival was exercised largely through taboo. One form, the institutionalized sex taboo, co-extensive with human society, exists today at the base of family life—the socialized form



of sex relationship. In early ages, fear of contamination by woman was the essential element of this taboo. Later, emphasis was placed on her mystic and uncanny power. Through further transformations in the early Christian period, the 2 extremes in attitude are arrived at which regard woman as unclean and in league with demons, culminating in witchcraft persecutions, and the conception of her as an ideally pure being who must remain chaste until her marriage. These taboo survivals act today, dysgenically, by leaving girls in ignorance of fundamental life processes and unprepared for the actualities of wifehood and motherhood. Prostitution, with its attendant evils, is an indirect effect of the struggle between man's instinctive needs and his mystical conception of woman. Such taboos subject marriage and motherhood to penalties which the trained and educated woman refuses to pay. This again results in a loss of eugenic motherhood.—Part III. The sex problem in the light of modern psychology. Taboo control compels conformity to arbitrary standards of masculinity and femininity, and in the ensuing conflict the emotions seek other channels of activity. Such impulses may reach out to envelop all mankind, find an outlet in religious feeling or stop at erotic fancy and day dreaming. Becoming habitual, they interfere with a return to natural activities with resultant genetic loss. Homosexual fixations established in college or among those engaged in similar lines of work also hinder the marriage of large numbers of able women. Choice of a mate is determined by irrational impulses which lie far below the levels of consciousness, and far outweigh eugenic considerations. Society being more interested in the manner of expression of the love life of the individual has permitted dysgenic influences to continue in the psychic life generation after generation. Most potent of these is the conflict between group regulations and interests of the individual. Cramping effect of marriage lessens its attractions for the ambitious man or woman; the most vital and aggressive stock fail to reproduce with consequent loss to the social organism in the intergroup struggle. Our aim should be a type of social organization where the production of eugenic offspring would bring the same approval and reward as is now accorded egoistic activities. The greatest triumph of society in the manipulation of the sexual and reproductive life will come when it is able to condition the emotional reaction of the individual by the substitution of the eugenic ideal for the parental fixation and to focus the sentiment of romantic love upon eugenic traits. The responses to be broken down are for the most part formed in early childhood and have thus become firmly impressed on the organism; but psychological experiments have proved that even the best established conditioned reactions can be broken down and others substituted so that the situation is not hopeless. A step in the right direction has already been taken through the increasing freedom of women and the constant association of the sexes in the educational and business world. The new ideal of love which is being developed combines complete understanding and frankness with erotic attraction and the tenderness of romanticism. It implies a type of marital relationship in which there is preservation of the personality with a harmony of interests absent from the old-fashioned marriage. A solution of the conflict between individual and group interests, then, calls for a more rational form of social control freed from the long ages of taboo restriction, and based upon accurate biological and psychological knowledge. Such rationalization will take into account the value of the new ideal of love, grant a greater degree of personal autonomy in sexual relationships in so far as this can be correlated with the welfare of the children, and attempt to condition the emotional reactions to respond to stimuli which shall insure eugenic mating naturally and without the intervention of legislation.—W. B. Key.

2470. LANCEFIELD, REBECCA C., AND CHARLES W. METZ. Non-disjunction and the chromosome relationships of *Drosophila Willistoni*. Proc. Nation. Acad. Sci. [U. S. A.] 7: 225-229. 10 fig. 1921.—Genetic and cytological evidence is given for the occurrence of non-disjunction of the sex chromosomes in *Drosophila Willistoni* Sturt. The genetic evidence is in all respects like that given by Bridges for the same phenomenon in *D. melanogaster*, and similar classes of exceptional flies are found. The most interesting point established by the cytological evidence is that the pair of sex-chromosomes in *D. Willistoni* is not the same pair shown by Bridges to be the sex chromosomes in *D. melanogaster*. They are one of the long V-shaped pairs instead of the shorter rod-like pair. This indicates that either the chromosome resemblances

are superficial or that the sex-determining elements (genes) have been transferred from one chromosome to another. The actual sex-linked characters observed in *D. Willistoni* are very different from any in *D. melanogaster*.—H. H. Plough.

2471. LAUGHLIN, HARRY H. *Eugenics in Germany*. *Eugenics Rev.* 12: 304-307. 1921.—Modern civilization is a blend between Germanic blood and classical culture. Inhabiting the regions which surround the Baltic Sea, the Germanic stock has, by successive migrations, infused fresh life into decadent states and assumed leadership in several nationalities. For several decades prior to the Great War, these migrations had virtually ceased. The result was over-population in Germany. An ambitious military government inveigled the people into the belief that the future service of Germany lay not in the rejuvenation of decadent stocks through the infiltration of her blood, but through conquest to become the chief teacher and assimilator of the nations.—The project failed but in the new Constitution many provisions which insure continuing racial vigor are incorporated. Chief among these are the following: The general national government has the exclusive legislative authority over "right of changing residence, immigration and emigration and extradition."—The general government is to exercise the right of legislation over criminal law, poor laws, and vagrancy; population policy; provisions affecting maternity, nurslings, young children and adolescents; national health, veterinaries, protection of plants from disease and pests; labor laws, insurance and protection of workmen and employes, and employment agencies. Marriage is stated to be the foundation of family life and the nation. As such it is placed under the particular protection of the Constitution and is based on the equal right of the sexes. Families with numerous children have a claim for compensating care.—Legal discriminations against women no longer exist. There are no orders of nobility, but the aristocracy of natural ability is recognized in article 128, which admits all citizens "to public office according to the provisions of the law and their abilities." Special provision is made for conserving the health of the nation and especially for the protection of motherhood in the stress of modern industrial life. In admitting all citizens of the State to public office and making liberal provision for the nurture of all children irrespective of parentage, Germany recognizes principles fundamental in a democratic form of government which, it is stated, other nations would do well to emulate.—W. E. Key.

2472. LEHMANN, E. [German rev. of: BAUR, E. *Die wissenschaftlichen Grundlagen der Pflanzenzüchtung; ein Lehrbuch für Landwirte, Gärtner und Forstleute*. (The scientific principles of plant breeding; a text-book for farmers, gardeners, and foresters.) 115 p. Gebrüder Borntraeger: Berlin, 1921.] *Zeitschr. Bot.* 14: 300-301. 1922.

2473. LEHMANN, E. [German rev. of: RASMUSON, HANS. *Beiträge zu einer genetischen Analyse zweier Godetia-Arten und ihrer Bastarde*. (Contribution to a genetical analysis of two species of *Godetia* and their hybrids.) *Hereditas* 2: 143-289. 1 pl., 29 fig. 1921 (see Bot. Absts. 9, Entry 1366).] *Genetica* 4: 303-305. 1922.

2474. LOTSY, J. P. [Dutch rev. of: GOULD, CHARLES W. *America a family matter*. 181 p. Charles Scribner's Sons: New York, 1920.] *Genetica* 4: 82-87. 1922.

2475. McCANDLESH, A. C., and L. M. WINTERS. A study in bulls. *Jour. Dairy Sci.* 3: 529-539. 1920.—A résumé is given of work already done to determine the value of pure-bred bulls by comparing the records of daughters with those of dams. In the present investigation bulls of various breeds were used. Variation in ability to transmit producing capacity to daughters is not a breed characteristic. If dams have as high or higher potentialities of production than sires, it is very difficult to judge the merits of the sires. Similarity in breeding is not an indication of similarity in producing ability or in transmission of this ability.—E. Roberts.

2476. McCLEUNG, C. E. [Rev. of: SHARP, LESTER W. *An introduction to cytology*. 15 x 23 cm., vii + 452 p., 159 fig. McGraw-Hill Book Co.: New York, 1921.] *Science* 55: 482. 1922.

2477. MATTFELD. [German rev. of: ALMQUIST, ERNST. Studien über *Capsella bursa-pastoris* (L). II. [Studies on *Capsella bursa-pastoris* (L).] Acta Hort. Bergiani 7: 41-46, 16 fig. 1921 (see Bot. Absts. 8, Entry 208).] Bot. Jahrb. 57: 17. 1922.

2478. NACHTSHEIM. [German rev. of: FEDERLEY, HARRY. Beiträge zur Kenntnis der Säugetiergametogenese. I. Die Spermatogenese von *Mus silvaticus* L. (Contribution to the knowledge of mammalian gametogenesis. I. The spermatogenesis of *Mus silvaticus*.) Acta Soc. Sci. Fennicae 48: 5-37. 1 pl. 1919.] Arch. Zellf. 16: 297-298. 1922.

2479. NACHTSHEIM. [German rev. of: FOOT, KATHERINE. Preliminary note on the spermatogenesis of *Pediculus vestiment*. Biol. Bull. 37: 371-384. 2 pl. 1919.] Arch. Zellf. 16: 296-297. 1922.

2480. NACHTSHEIM. [German rev. of: HARMAN, MARY T. Chromosome studies in Tettigidae. II. Chromosomes of *Paratettix BB* and *CC* and their hybrid *BC*. Biol. Bull. 38: 213-230. 3 pl. 1920 (see Bot. Absts. 7, Entry 1763).] Arch. Zellf. 16: 294-295. 1922.

2481. NACHTSHEIM. [German rev. of: SCHRADER, FRANZ. Sex determination in the white-fly (*Trialeurodes vaporariorum*). Jour. Morphol. 34: 267-305. 4 pl. 1920 (see Bot. Absts. 7, Entry 239).] Arch. Zellf. 16: 295. 1922.

2482. NACHTSHEIM. [German rev. of: SHAFFER, E. L. A comparative study of the chromosomes of *Lachnosterna* (Coleoptera). Biol. Bull. 38: 83-103. 1920 (see Bot. Absts. 8, Entry 1119).] Arch. Zellf. 16: 293. 1922.

2483. NACHTSHEIM. [German rev. of: SMITH, BERTRAM G. The individuality of the germ-nuclei during the cleavage of the egg of *Cryptobranchus allegheniensis*. Biol. Bull. 37: 246-286. 9 pl. 1919 (see Bot. Absts. 4, Entry 771).] Arch. Zellf. 16: 291. 1922.

2484. NILSSON, N. HERIBERT. [German rev. of: LUNDBORG, H. En svensk bondesläkts historia sedd i rasbiologisk belysning. Svenska Sällskapetets för Rashygien skriftserie II. (The history of a Swedish peasant family in eugenical light. Papers of the Swedish eugenical association II.) 14 × 21 cm., 40 p., 8 fig. P. A. Norstedt & Soners Förlag: Stockholm, 1920 (see Bot. Absts. 5, Entry 414).] Arch. Rass.- u. Ges. Biol. 14: 73-75. 1922.

2485. P., J. H. [Rev. of: HAYES, HERBERT KENDALL, AND RALPH JOHN GARBER. Breeding crop plants. 15 × 23 cm., 328 p., 66 fig. McGraw-Hill Book Co., Inc.: New York, 1921 (see Bot. Absts. 10, Entry 944).] Jour. Amer. Soc. Agron. 14: 53-55. 1922.

2486. P[OPENOE], P[AUL]. [Rev. of: LONG, H. W. Motherhood. 195 p. Richard G. Badger: Boston, 1921.] Jour. Heredity 12: 401. 1921.

2487. SEILER, J. [German rev. of: GOLDSCHMIDT, R. Die quantitative Grundlage von Vererbung und Artbildung. (The quantitative basis of heredity and species formation.) 163 p., 28 fig. Julius Springer: Berlin, 1920.] Arch. Zellf. 16: 287. 1922.

2488. SETCHELL, WILLIAM ALBERT, THOMAS HARPER GOODSPEED, AND ROY ELWOOD CLAUSEN. Inheritance in *Nicotiana Tabacum*. I. A report on the results of crossing certain varieties. Univ. California Publ. Bot. 5: 457-582. Pl. 55-85, 2 fig. 1922.—This is the 1st of a series of reports on the results of intercrossing certain varieties of *Nicotiana Tabacum*. The work, begun in 1909, to test Comes's hypothesis of the origin of the numerous cultivated forms belonging to the *Tabacum* group, has been broadened until at least 4 distinct but inter-related series of problems are being studied. The report presented here concerns itself with a detailed study of Mendelian differences among a typical set of *N. Tabacum* varieties.—Three sets of cultures are described in the present article; the *angustifolia-macrophylla* reciprocal

crosses; the *calycina-virginica* reciprocal crosses; and the *alba-macrophylla* reciprocal crosses. The results are summarized by the authors as follows: (1) All differences between varieties of *Tabacum* can be analyzed in a Mendelian fashion, if sufficient refinement in methods be introduced. (2) Stable recombinations of parental characters can readily be obtained with 3-4 generations of self-fertilization. (3) Characters outside the range between the parents are sometimes produced following hybridization, and these may be readily established in stable lines by self-fertilization. (4) The petioled leaf base of *angustifolia* and the sessile leaf base of *macrophylla* differ in at least 3 pairs of factors. (5) A single factor difference exists between normal and split hose-in-hose flowers. (6) Two pairs of factors account for the relation existing between red, light pink, and white flower color. A 3rd pair of factors is necessary to account for dark red.—On the theoretical side it is pointed out that: (1) Derivation of relationships and erection of systems of classification after the manner of Comes and Anastasia cannot be relied upon unless supported by experimental evidence. (2) An adequate scheme of classification should be based upon identities and dissimilarities in the genotypes, irrespective of the derivation of the forms in question. (3) Mendelian analysis in *Tabacum* requires that special attention be paid to residual portions of the genotype, so that the factor differences under consideration act in a stable residuum most favorable for emphasis of the character differences under investigation.—W. A. Setchell.

2489. SIEMENS. [German rev. of: BAUER, J. Die konstitutionelle Disposition zu inneren Krankheiten. (The constitutional disposition to internal diseases.) xi + 660 p., 63 fig. Julius Springer: Berlin, 1921.] Arch. Rass.- u. Ges. Biol. 14: 79-81. 1921.

2490. SIEMENS. [German rev. of: SCHALLMAYER, W. Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst. (Heredity and selection. Fundamentals of social biology and the doctrine of service to the race.) 3rd ed., 8 vo., xvi + 536 p. Gustav Fischer: Jena, 1918 (see Bot. Absts. 2, Entry 704).] Arch. Rass.- u. Ges. Biol. 14: 75-77. 1922.

2491. STARK, PETER. [German rev. of: (1) SALISBURY, E. J. Variation in *Eranthis hyemalis*, *Ficaria verna*, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth. Ann. Botany 33: 47-79. 20 fig. 1919 (see Bot. Absts. 2, Entry 703). (2) IDEM. Variation in *Anemone apennina* L., and *Clematis vitalba* L., with special reference to trimery and abortion. Ann. Botany 34: 107-116. 9 fig. 1920 (see Bot. Absts. 5, Entry 1625).] Zeitschr. Bot. 14: 259-261. 1922.

2492. STEWART, G. Potato improvement by hill selection. Utah Agric. Exp. Sta. Bull. 176. 28 p., 14 fig. 1920.—A report is presented of 9 years of hill-unit selection preceded by 3 years of variety test. Practically all the selection work was done with a blue-sprout variety, the Majestic. Strains isolated by selection were compared with each other and with unselected stock of the original variety. Such a comparison for 6 years of the best pedigree selection showed an average increase in yield of 60.9 per cent and an increase of 24.4 per cent in average size of tuber. Biometrical data for weight of hill for a number of strains are given. Some selections were made on the basis of foliage characteristics, and 2 chlorotic strains were isolated.—C. H. Myers.

2493. STURTEVANT, A. H. A case of rearrangement of genes in *Drosophila*. Proc. Nation. Acad. Sci. [U. S. A.] 7: 235-237. 1921.—In *Drosophila simulans* it has been shown that 5 mutant genes in the X-chromosome are allelomorphous to, and lie in the same sequence in the chromosome as, 5 similar genes in *D. melanogaster*. Study of the situation in the 3rd chromosome of *D. simulans* discloses the interesting fact that identical loci in this group do not lie in the same sequence as in *D. melanogaster*. In the latter species scarlet is 3 units from peach and delta 19 units further on. In *D. simulans* scarlet is 25 units from deltoid and peach 36 units beyond. Several methods of accounting for this result are suggested. The demonstration indicates that identical loci in related species are not necessarily carried in the same order in the chromosome.—H. H. Plough.

2494. STURTEVANT, A. H. Linkage variation and chromosome maps. Proc. Nation. Acad. Sci. [U. S. A.] 7: 181-183. 1921.—Citations are given which show that Detlefsen's conclusion [see Bot. Absts. 9, Entry 742], that crossing over is not necessarily proportional to the distance between the genes of the chromosomes, has been the accepted idea of the *Drosophila* workers as long as they have been constructing chromosome maps, and that therefore Detlefsen's criticism is based on a misconception.—H. H. Plough.

2495. STURTEVANT, A. H. The North American species of *Drosophila*. Carnegie Inst. Washington Publ. 301. iv + 150 p., 3 pl. 1921.—Seven of the 15 sections are of genetical interest. (1) Behavior. Males of *D. melanogaster* will copulate with females of at least 3 other species, but are fertile only with *D. simulans*; the reciprocal of the latter mating is also fertile. Males of *D. melanogaster* without sex combs mate as readily as normal males; a male with wings is able to excite a female sexually more quickly than one with wings removed; neither sex chooses normal in preference to mutant types for mating. "All attempts to induce courtship by means of visual or olfactory stimuli alone have failed in *Drosophila*." It is thought that visual and tactile stimuli are probably involved in producing courtship. (2) Genetics. A brief account is presented of the general results of breeding work with *D. melanogaster*. Data from 12 other species are also considered; so far as known these have similar genetical behavior. There is " \* \* \* convincing evidence \* \* \* that in some cases the same identical mutation has occurred in different species." (3) Chromosomes. Present knowledge of *Drosophila* chromosome groups is discussed. (4) Intraspecific variability. Very few inherited variations are found persisting in nature; the range of non-inherited variations is not great. Secondary sexual characters are relatively inconspicuous; a list is given of those observed. (5) Geographical distribution. A list is given for each of the main geographical regions. (6) Species hybrids. *D. simulans* ♀ × *D. melanogaster* ♂ gives hybrid ♂♂, very few hybrid ♀♀; the reciprocal gives hybrid ♀♀ only. Hybrids are all sterile, and are intermediate in appearance between the parents. Non-disjunctional data, etc., are also considered. Cytoplasm, as well as chromosomes, is involved in determining the viability of the hybrid. Data indicate that the 2 species differ in a number of genes. Some genes are identical and subject to identical mutations in the 2 species; the linear order is also the same. (7) Specific vs. mutational differences. "Species, then, differ from each other in many genes. The differences though numerous are such that each produces only a slight effect on the organism. These differences are of the same kind as are the mutational differences, and may be supposed to have arisen by mutation." Specific cases of parallelism between mutant characters and characters of wild species are given.—C. W. Metz.

2496. SUEMATSU, N. On the resistant varieties. Ann. Phytopath. Soc. Japan. 14: 53-56. 1921.—[Text mostly in Japanese.] A review is presented of papers dealing with the breeding of disease-resistant varieties of plants and some discussion of them. No original matter is reported.—Takeo Hemmi.

2497. UBISCH, G. von. Abweichungen vom mechanischen Geschlechtsverhältnis bei *Melandrium dioicum*. [Deviations from the mechanical sex ratio in *Melandrium dioicum*.] Biol. Zentralbl. 42: 112-118. 1922.—The author discusses the results of G. H. Shull's experiments on *Lychnis* (*Melandrium*) *dioica* with respect to sex-linked inheritance of a factor for broad vs. narrow leaves, and on the basis of Corren's demonstration that the male-producing pollen-tubes germinate more slowly or grow more slowly through the style, decides that Shull's formulation needs modification. The author concludes that pollen grains characterized by the coupled factors *B* (= broad leaf) and *F* (= femaleness) are somewhat speedier in reaching their goal than those possessing the combination *f**b* and the latter considerably speedier than *Fb*. In the eggs the *Fb* combination is also assumed to be slightly injurious. To account for certain unexpected results, the author assumes that the broad-leaf factor is not completely coupled with sex, but that occasional crossing over takes place. He considers the alternative hypothesis that sex potency or "valence" becomes modified so that a constitution which would have ordinarily produced a female, now produces a male, and vice versa,

to be untenable because of the rarity of occurrence of hermaphrodites (intersexes).—*Geo. H. Skull.*

2498. VOGT, A. Der Altersstar, seine Heredität und seine Stellung nach exogener Krankheit und Senium. [Senile cataract, its heredity and its place in exogenous disease and senile degeneration.] Zeitschr. Augenheilk. 40: 123-137. 1918.—The wide range in the life span of different plants and animals is well known. A range within smaller limits is found in human strains, and, with reference to individuals, different organs show senility at different periods. These individual variations are also found in different tissue elements of the organ and in different portions of the same tissue. The author differentiates between acute forms of senile cataract and the tendency toward the same as evidenced by clouding of the lens at the periphery (coronary cataract). The latter is found to be hereditary. He suggests a connection with myotonic dystrophy which has been related to abnormalities of the internal secretions. Conclusions are based on the following cases: A woman with an advanced case of coronary cataract has 5 grown children of whom 4 are affected. In other families, father or mother and daughter, 2 and 3 members of fraternity are similarly affected. In one network of 41, covering 2 generations, 19 were examined, of whom 15 were affected.—*W. E. Key.*

2499. W., D. D. Effect of selection of "seed" on the yield of the potato crop. Jour. Dept. Agric. Ireland 21: 412-414. 1921.—Tubers from high-yielding stalks of several varieties produced higher-yielding plants than tubers "of corresponding size" selected at random, although both produced apparently disease-free plants.—*Donald Folsom.*

2500. WILLMER, B. H. Structures and homologies of freemartin gonads. Jour. Exp. Zool. 33: 63-127. 18 fig. 1921.—In the freemartin (heifer calf twinned with bull) the relatively undifferentiated gonad, primarily of female character, is modified toward a masculine type by the influence of hormones from the anastomosed male circulation. There are 3 grades of modification recognized, which represent progressive steps toward maleness, and in a fashion are connecting links between the embryonic ovary and the embryonic testis. These grades are based on: (a) seriated gradations between the medullary cords and the seminiferous tubules displayed by the sexual cords; (b) an increase in the number of interstitial cells as the gonad increases in degree of maleness; (c) developing connections (tubuli recti) between the rete tubules and the seminiferous tubules as well as the rete tubules and the epididymal tubules in proportion to the degree of transformation away from the female gonad; (d) increasing development of the epididymis from absence in a low degree of transformation to typical presence in a high degree of transformation; and (e) rearrangement of the blood vessels from the typical ovarian pattern toward the typical male pattern. The limit of transformation in the male direction is represented by a morphologically complete testis from the standpoint of sperm formation functionally inactive. A graded series of transformations between the ovary and testis exists dependent on: (a) time of introduction of the male hormones; (b) the potency of the male hormones; (c) the duration of their action; (d) the absence of normal ovarian hormones; and (e) the absence of interstitial cell secretions in freemartin gonads. Other genital organs are changed correlatively with the gonad (uterus, external genitalia, vas deferens, and seminal vesicle). Some lateral differentiation may exist dependent on the degree of change on one side being greater than on the other. In the freemartin gonads, the interstitial cells are either absent or functionless, bearing no relation to sex instincts or to secondary sex characters. Apparently the mammalian ovary possesses morphological structures homologous or at least equivalent to those of the testis, as demonstrated by the ease of transformation of the ovary into the testis in the freemartin.—*Edward N. Wenigworth.*

## HORTICULTURE

J. H. GOURLEY, *Editor*H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 2120, 2128, 2151, 2240, 2350, 2392, 2412, 2445, 2631, 2891, 2893, 2944, 2946, 2947, 2962, 2972, 3065, 3098, 3103, 3155, 3194, 3202, 3203, 3248)

## FRUITS AND GENERAL HORTICULTURE

2501. ANONYMOUS. *When to do what you want to do. The month's reminder* (Dec.). *Gard. Mag.* 34: 176-177. 1921.—The article discusses things to be done in December in caring for fruit plants, vegetables, and flowers, including both outdoor and inside work with crops which are forced.—*H. C. Thompson.*

2502. ALLEN, W. J., and W. LE GAY BRERETON. *New standard numerical pack for apples.* *Agric. Gaz. New South Wales* 33: 120-122. 2 fig. 1922.—The container is the modified Canadian apple case with a capacity of an Imperial bushel. The new pack is characterized by edge packing instead of flat packing, the former being considered more suitable to apples. A table for the 3-2 pack for 4 tiers and 3-3 pack for 5 tiers, is given, the number of apples running from 100 to 195 per box. Certain of the packing runs are to be further tested.—*L. R. Waldron.*

2503. BARCLAY, JOHN H. *Commercial apple growing in New Jersey.* *Bull. Delaware State Bd. Agric.* 10: 20-29. 1921.—The author reports on varieties grown and cultural and spraying practices common in New Jersey.—*T. F. Manns.*

2504. BATCHELOR, L. D. *Winter injury to young walnut trees during 1921-22.* *California Agric. Exp. Sta. Circ.* 234. 5 p. 1922.—Early fall frosts are a common cause of injury to young trees, which are more likely to suffer from them than mature bearing trees, because the latter become dormant earlier in the season. Walnut foliage which is still green is apparently as subject to frost injury as tender vegetables. The frosted foliage drops prematurely, exposing the immature twigs to the sun and causing excessive moisture loss and eventually death. Frost injury may be prevented if it is possible to mature the young walnut trees early, so that the leaves will turn yellow and fall normally before the early frosts. Early maturity can be promoted by withholding irrigation water in the late summer and early fall.—*A. R. C. Haas.*

2505. BECKWITH, C. S. *Cranberry spraying apparatus.* *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [7-12.] 1921.—Tests of high-powered spraying apparatus with solid stream nozzles are reported. Injury to vines from tramping and dragging the hose has occurred. With a pressure of 300 pounds 8 men sprayed 20 acres in 4 hours and 10 minutes, using 200 gallons per acre. Ninety-five per cent of the vines had a heavy, even coating of the mixture. The use of the solid stream sprayer in New Jersey will be limited, as not more than 5 growers spray 300 acres. This machine as last experimented with sprays about 60 acres in 8 hours. A grower is safe in planning to take as much as 8 days for 1 complete spraying.—*J. K. Shaw.*

2506. BECKWITH, CHARLES S. *Report of cranberry sub-station for 1921.* *Amer. Cranberry Grower's Assoc. Proc. Ann. Meeting* 52: 9-16. 1921.—The year's results indicate that for Savannah bottoms nitrate of soda is superior to dried blood as a nitrogen carrier and that 30 pounds of nitrogen give larger yields than 20 pounds. Yields for 3 successive years are given. Comparison of acid phosphate and phosphate rock showed larger gains from the former. The larger the amount of phosphoric acid up to 80 pounds the larger the yields. For poor Savannah soil 800 pounds of a mixture of 75 pounds nitrate of soda, 75 of dried blood, 200 of rock phosphate, and 50 of sulphate of potash gave better results than larger or smaller amounts.

Results of 2 years' experiments on a muck bottom are not extensive enough to give an accurate formula for a suitable mixture. Lime applications have given increases quite regularly after the 2nd year on Savannah bottoms and after the 3rd on muck bottoms. Flooding experiments early in August to control the cranberry girdler showed less damage to the crop by shallow flowing on clear days than by deep flowing on cloudy days. Flooding for 3 days early in August controlled the girdler and also prevented much of the year's feeding.—*J. K. Shaw.*

2507. BECKWITH, C. S. The effect of fertilizer treatments on Savannah cranberry land. *Soil Sci.* 12: 183-196. 1921.—Field experiments on Savannah cranberry land show that the most profitable nitrogen fertilizer is sodium nitrate and dried blood. Ammonium sulphate was unsatisfactory and calcium cyanamid of doubtful value. Acid phosphate and rock phosphate were efficient sources of phosphorus. Potassium sulphate and potassium chloride were good sources of potash. Cranberry bogs were found deficient in phosphorus, as high as 80 pounds of phosphoric acid per acre producing large increases in the crop. Sodium nitrate to give 20 pounds of nitrogen gave excellent returns, and a complete fertilizer of 500-800 pounds per acre gave good results. Over-fertilization causes excessive vine growth and soft berries and induces insect attack.—*W. J. Robbins.*

2508. BLIN, HENRI. Comment hiverner les plantes d'agrément. [How to winter plants successfully.] *La Nature* 1922: Suppl. 15-16. 1922.—Directions are given for wintering various plants, of which lists are included. The following groups are discussed: window plants; plants of cool, temperate, and warm greenhouses; and bulbous and tuberous plants.—*J. R. Schramm.*

2509. BLOKZEIJL, K. R. F. Java coco industry. *Pharm. Era* 54: 276. 1921.—The author gives an account of the introduction of coco cultivation into Java, the extent of the plantations, regions favorable for its cultivation, methods of harvesting and marketing, and the exports from 1916 to 1920. He also compares Java with Peruvian coco for cocaine production.—*J. M. Sterling.*

2510. BRITTON, W. E. First report of the tree protection examining board. *Connecticut [New Haven] Agric. Exp. Sta. Bull.* 231. 339-350. 1921.—The text of the Connecticut law effective July 1, 1919, creating a tree protection examining board is given together with a set of questions once used in examining applicants for the business of protecting trees. A program is given of the institute held for the instruction of prospective and active tree protectors. A short list of publications relating to the care of trees is included.—*Henry Dorsey.*

2511. BROWN, A. N. Handling a thousand acre orchard. *Bull. Delaware State Bd. Agric.* 10: 29-36. 1921.—As manager of 1,400 acres in several orchards, the author summarizes the handling of labor, equipment, spraying, fertilizing, cultivation, cover crops, and marketing.—*T. F. Manns.*

2512. C., A. [Rev. of: LECOMTE, H. Une Juglandacée du genre *Carya* en Indochine. (A Juglandaceous plant of the genus *Carya* in Indo-China.) *Bull. Mus. Hist. Nat. [Paris]* 1921: 437-440. Pl. 1. 1921.] *Rev. Bot. Appl.* 1: 233. 1921.

2513. CALVINO, MARIO. Ensayos de abonos sobre "Fresa." [Experiments with fertilizers on strawberries.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 586-587. 1921.—Varieties used were: Missionary, Aroma, and Lady Corneille. Three plots of 1 hectare each were laid out for each variety, 1 plot in each set being left as a check. Net gains varying from 3,824 to 7,708 per hectare were obtained. The tests indicate the value of organic material in the dry red soil in which the berries were grown. Well-rotted manure, besides being rich in nitrogen, potash, anhydrous phosphorus, and lime, profoundly modifies the physico-chemical properties of these soils, maintaining them more humid. Calcium carbonate is useful and ammonium phosphate a good fertilizer. It is advised that previous to planting, well-rotted manure and



calcium carbonate be used, and the ammonium phosphate added at planting time or shortly after.—*G. R. Hoerner.*

2514. CHEVALIER, AUG. *Histoire et amélioration des pommiers, et spécialement des pommiers à cidre.* [History of the apple and its improvement, especially of cider apples.] *Rev. Bot. Appl.* 1: 149-215. 1921.—The history of pomology in France is considered; then the species and varieties of the genus *Malus* are discussed from a geographical point of view. The writer next traces the origin of the principal groups of apples, describes the methods by which new varieties have been obtained in France, and discusses the usefulness of experimental orchards. In connection with investigations made in French Indo-China with certain native apples the question is raised as to whether the apple could not be grown in the tropics, provided suitable varieties are obtained. It is urged that further biological studies be made with the aim of improving present varieties and extending the areas where they may be grown.—*P. G. Russell.*

2515. CHEVALIER, AUG. *La culture des arbres fruitiers en Syrie et Cilicie.* [Cultivation of fruit trees in Syria and Cilicia.] *Rev. Bot. Appl.* 1: 129-148. 1921.—An official inquiry yielded much information concerning the present status of fruit growing in these countries, which is reported here. Notes on the local varieties, distribution, and cultural data are given for each fruit. The fruits included are: apricot (*Prunus armeniaca*), almond (*Amygdalus communis*), banana (*Musa paradisiaca sapientum*), Seville orange (*Citrus aurantium*), lemon (*Citrus limonia*), cherry (*Prunus cerasus*), chestnut (*Castanea sativa*), citron (*Citrus medica*), wild quince (*Cydonia oblonga*), date (*Phoenix dactylifera*), fig (*Ficus carica*), pomegranate (*Punica granatum*), kaki (*Diospyros Kaki*), mandarin (*Citrus nobilis deliciosa*), Loquat (*Eriobotrya japonica*), hazelnut (*Corylus avellana*), walnut (*Juglans regia*), sweet lime (*Citrus limetta*), orange (*Citrus sinensis*), peach (*Amygdalus persica*), pistache (*Pistacia vera*), pear (*Pyrus communis*), apple (*Malus sylvestris*), plum (*Prunus domestica*), and grape (*Vitis vinifera*).—*P. G. Russell.*

2516. COLLINS, H. C. *How vanilla is grown in Mexico.* *Pharm. Era* 55: 52. 1922.—The author gives a brief account of preparing the ground for a vanilla plantation, habits of the plants, methods of artificial pollination, harvesting, and curing the beans, and grading and preparing the product for export.—*C. M. Sterling.*

2517. DANIEL, L. *Grafting and evolution.* *Sci. Amer. Monthly* 4: 115-117. 8 fig. 1921. In the majority of cases successful results of grafting have been obtained only between species of the same class. De Candolle therefore considered successful grafting as a criterion of the relative parentage of groups and species and recommended it as a means of solving the question of classification. Experiments have proved that this criterion has not the importance attributed to it. The pear is easily grafted on the quince, but the quince can not be grafted on the pear. There are other ligneous and herbaceous plants the reciprocal graftings of which do not succeed with equal facility. Although the exact cause is unknown, there are in 1 family and sometimes in 1 class species which graft easily, and others which do not. Even when ordinary grafting only is used, successful grafts taken as a criterion of parentage would result in groupings contradicting the best theories established by the natural method. As a result of Carrel's experiments with animal grafting de Candolle's theory has been emphasized to establish the relationship of some of the higher animals with man. The evidence from plant grafts would not indicate that the theory could be successfully applied in this way.—*Chas. H. Otis.*

2518. DETJEN, L. R. *A native prune.* *Bull. Delaware State Bd. Agric.* 103: 37-42. 1921.—The author reports a plum tree the fruits of which neither dropped nor rotted when ripe. It was named "Herald, because it may be heralding a new race of prunes for eastern America."—*T. F. Manns.*

2519. DOAN, JOHN L. What, why and how much fruit to plant. *Gard. Mag.* 34: 323-324. 1922.

2520. FRANKLIN, H. J. The cranberry industry. *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [3-5]. 1921.—Infestations of young open-feeding worms such as gypsy moth, army worms, and span worms can be most easily discovered in their early stages with the help of an insect collecting net. Black leaf "40" is a most valuable insecticide for "black heads," the girdler, and other insect pests. Cooperation with the Weather Bureau coupled with local observation makes possible the prediction of frosts.—*J. K. Shaw.*

2521. GOODMAN, F. L. Blackberry culture. *British Columbia Dept. Agric. Circ. New Hort. Ser.* 57. 9 p., 4 fig. 1921.

2522. HARRISON, G. HALE. Varieties of fruits for the Delaware and Chesapeake Peninsula. *Bull. Delaware State Bd. Agric.* 10<sup>2</sup>: 14-19. 1921 [Comprising *Trans. Peninsula Hort. Soc.* 1921.]—The author recommends the following apples in order of ripening: Yellow Transparent, Williams Early Red, Duchess of Oldenburg, Northwestern Greening, McIntosh, Grimes Golden, Delicious, Stayman Winesap, Winesap, York Imperial, and Gano. Carman, Hiley, Ray, Belle of Georgia, and Elberta peaches are recommended.—*T. F. Manns.*

2523. HARVEY, E. W. The importance of sulphate of ammonia in horticulture. *Bull. Delaware State Bd. Agric.* 10<sup>2</sup>: 46-50. 1921.

2524. HEINE, KARL. Die Bedeutung und Anzucht der Haselnüsse. [Importance and growing of hazelnuts.] *Möller's Deutsch. Gärt. Zeitg.* 37: 33-34. 1922.—The following varieties are recommended on a commercial scale in Germany: Italienische Volle, Hallesche Riesen-nuss, Englische Riesen-nuss, Burchhardt's Zellernuss, Webb's Preisenuss.—*J. C. Th. Uphof.*

2525. HOLMAN, JAMES D. The scooping of cranberries. *Amer. Cranberry Growers' Assoc. Proc. Ann. Meeting* 52: 1-4. 1922.—Scarcity of labor has led to an increasing use of the scoop for harvesting cranberries. The author began using scoops 25 years ago and has harvested 90 per cent of his crops for the last few years with metal toothed scoops. The bogs are raked each year with knife rakes to take out the top runners. Sanding the bogs produces ideal conditions for scooping. Injurious effects of scooping are believed to be confined to high bog land or bogs where sanding is difficult.—*J. K. Shaw.*

2526. HOLMAN, JAMES D. Twenty years of spraying. *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [1-3]. 1921.—Spraying with Bordeaux mixture largely prevents cranberries from deteriorating in transit. It has been found necessary to spray before the bloom opens. The author uses a 3½ horse power engine with 200-250 pounds pressure, and 4 men and a boy can spray 10-15 acres daily. Flooding bogs till July 15 rests the bogs for a season, cleans up most of the grass, and prepares for a heavy crop. Spraying has changed cranberry growing in New Jersey from a hazardous undertaking to a safe investment.—*J. K. Shaw.*

2527. HOSTERMANN, G. Kulturversuche mit elektrischem Licht. [Culture experiments with electric light.] *Gartenwelt* 26: 74-75. 1922.—Excellent results were obtained at the Horticultural College, Dahlem, by the use of Neon light. In the illuminated hot house 500 cucumbers, weighing over 277 kgm., were obtained; in the non-illuminated control house 370, weighing over 188 kgm. Artificial illumination will be of advantage financially early in the season before cucumbers are imported from the Netherlands. Tomatoes gave 96 and 69 kgm. respectively with and without artificial light. The 2nd year 485 cucumbers, weighing 230 kgm., and 370, weighing 165 kgm., and tomatoes weighing 101 and 70 kgm. respectively (being 44 per cent more under electric light) were obtained.—*J. C. Th. Uphof.*

2528. JONES, D. F. One reason why some fruits don't fruit. *Gard. Mag.* 34: 98. 2 fig. 1921.—In this discussion of self-sterility in various fruits it is pointed out that not only are some varieties self-sterile but also cross-sterile in certain combinations.—*H. C. Thompson.*

2529. K., A. [Rev. of: TRIBOLET, I. The pecan nut (*Hicoria pecan*) = *Carya olivaeformis* Nutt. Jour. Dept. Agric. Union South Africa 2: 129-132. 1921 (see Bot. Absta. 8, Entry 1980).] *Rev. Bot. Appl.* 1: 232, 233. 1921.

2530. K., A. [Rev. of: TRIBOLET, I. Walnuts. Jour. Dept. Agric. Union South Africa 2: 80-81. 1921.] *Rev. Bot. Appl.* 1: 232. 1921.

2531. KOCH, F. J. Chan OK and the ginseng trade. *Pharm. Era* 55: 45-47. 1922.—The author describes the cultivation and collection of wild ginseng, and its exportation, valuation, and sale in China.—*C. M. Sterling.*

2532. KRAEMER, HENRY. Practical cultivation of drug plants. *Pharm. Era* 54: 121-124. 1921.

2533. LETACQ, A. [Rev. of: *Compte-rendu du Congrès de la Noix, organisé par la Compagnie P.-L.-M. à Grenoble. October, 1920.*] [Proceedings of the Nut Congress, organized by the P.-L.-M. Company at Grenoble.] *Rev. Bot. Appl.* 1: 229-232. 1921.

2534. MANEY, T. J. Grape production and distribution in western Iowa. *Iowa Agric. Exp. Sta. Bull.* 199. 379-399. 1921.

2535. McCUE, C. A. Some problems of Delaware agriculture. *Bull. Delaware State Bd. Agric.* 10: 83-90. 1921.—The author emphasizes the problems of marketing, transportation, and production, and points out that the greatest problem in dairying is maintenance of permanent pastures. The need of grape juice factories and better disease control are the problems facing the grape industry. Peach and apple problems are discussed.—*T. P. Mann.*

2536. MIDDLETON, W. A. Cost of producing apples in the Okanagan and average yields and prices for leading varieties. *British Columbia Dept. Agric. Circ.* 38. 16 p. 1921.

2537. MURNEEK, A. E. A new test for maturity of the pear; pear harvesting and storage investigations (third report). *Oregon Agric. Exp. Sta. Bull.* 186. 28 p. 1921.—A new "pressure" test has been developed to measure conveniently the exact stage of maturity of the pear. A detailed description of the apparatus is given. Harvesting of Bartlett's for fresh shipments should commence when the pressure test indicates an average resistance of 35 pounds, and may continue till an average resistance of 25 pounds is reached. Other varieties of pears have different but equally consistent numerical indices. The percentage increase in transverse diameter of a Bartlett pear may be used as an index of the relative percentage increase in weight; the ratio is 1:3.5.—*A. E. Murneek.*

2538. MURRILL, W. A. The banana and its uses. *Sci. Amer.* 125-A (Dec.): 118-119. 2 fig. 1921.—Popular.—*Chas. H. Otis.*

2539. NIEKERK, S. W. VAN. Paarl Viticultural Station. *Jour. Dept. Agric. Union South Africa* 4: 229-232. 4 fig. 1922.—At this station vines from France, Spain, Portugal, Italy, Austria, Algeria, and Sicily are being tested for the production of grapes for wine-making and table purposes. The qualities of some of the varieties are described.—*E. M. Dodge.*

2540. PROSCHOWSKY, A. ROBERTSON. [Rev. of: POPENOE, WILSON. *Manual of tropical and subtropical fruits.* New York, 1920.] *Rev. Bot. Appl.* 1: 215-229. 1921.—The reviewer states that he is especially interested in this book because the climate of

southern California, mentioned as a promising region for testing tropical fruits, is very similar to that of the Cote d'Azur, southern France, where he himself is experimenting with tropical plants. He agrees that there is an immense field for activity in improving these tropical fruits. In connection with a killing frost at the Cote d'Azur in 1920, he raises the question as to whether it is profitable to attempt to grow in temperate regions plants from a warmer climate and concludes that it is profitable under certain conditions.—He believes that *Persea drymifolia* Cham. & Schlecht. should be considered a variety of *Persea americana* Mill. and not a distinct species as held by Popenoe. The principal fruits mentioned in the book are then taken up, with notes by the reviewer on their behavior on the Cote d'Azur.—P. G. Russell.

2541. RANKE, ALEXANDRA VON. *Kulturversuche mit elektrischem Licht.* [Culture experiments with electric light.] *Gartenwelt* 26: 98-99. 1922.—Lettuce plants, variety Bottner's Treib, having 6 leaves, were exposed to electric light and an equal number (32) were used as control plants. After 14 days the former were sufficiently developed to be sold; those grown in daylight matured only after 4-5 weeks. The former were not only better headed, but weighed 50 per cent more. The lilac Andenken an Ludwig Späth flowered under electric light 9 days earlier than in daylight, and flowers of *Viburnum opulus* whitened sooner. Strawberries (Deutsche Evern) illuminated in the middle of November flowered abundantly, and the fruits reached normal size, but did not ripen on account of the cold; none of the control plants finished flowering properly.—J. C. Th. Uphof.

2542. REINKING, O. A., and G. W. GROFF. *The Kao Pan seedless Siamese pummelo and its culture.* *Philippine Jour. Sci.* 19: 389-437. *Pl. 1-18.* 1921 [1922].—This is a comprehensive study of this very superior fruit and its culture. The variety occurs in certain delta regions in Siam where it is extensively cultivated, the water used for irrigation purposes being salt or brackish. Local cultural practices and irrigation by salt or brackish water seem to have a direct relation to the quality of the fruit, and possibly some relationship to the seedlessness.—E. D. Merrill.

2543. RIVIÈRE, GUSTAVE, et GABRIEL BAILHACHE. *Contribution à la physiologie de la greffe. Influence du sujet porte-greffe sur le greffon.* [Contribution to the physiology of the graft. Influence of the stock on the scion.] *Jour. Soc. Nation. Hort. France* 20: 361-362. 1920.—Of pear trees grafted on the same stock those making the greatest growth had been planted so deeply that roots formed above the graft union, while those which had made the least growth had no roots above the graft union. In the latter case the stock had a greater influence on the scion than in the former.—H. C. Thompson.

2544. RIVIÈRE, GUSTAVE, et GABRIEL BAILHACHE. *De l'atmosphère des pommes.* [The air in the apple.] *Jour. Soc. Nation. Hort. France* 22: 263-265. 1921.—A discussion is given of the air or gases in the cells of apples, to which is attributed their low density as compared to the pear. A table gives the total volume and composition of the gases in the fruit at different times.—H. C. Thompson.

2545. RIVIÈRE, GUSTAVE. *De la suppression partielle des fleurs du poirier.* [Partial suppression of flowers of the pear.] *Jour. Soc. Nation. Hort. France* 22: 336-337. 1921.—After experiments in removing some of the flowers in the cluster the author concludes that it is of no value.—H. C. Thompson.

2546. ROCK, J. F. *The Akala berry of Hawaii.* *Jour. Heredity* 12: 147-150. *Pl. S.* 1921.—The Akala berry (*Rubus macraei* Gray) is a variable species found on several islands of the Hawaii group as, for example, Kauai, Molokai, Maui, and Hawaii. On Kauai, it is an upright spineless shrub a few feet high with rather small dry berries. This type was placed by Hillebrand under *Rubus hawaiiensis*, with which it has little relationship. On Maui the plants resemble the typical species from Hawaii, the type locality, but the plants are exceedingly spiny and the fruits but half the size of those found on Hawaii. The species is best developed

on the slopes of the high mountains of Hawaii proper,—Hualalai, Mauna Loa and Mauna Kia. The largest fruited specimens were discovered on a small volcanic cone of greater age than the country surrounding it. The cone, known as Hinakapanula, is located at an elevation of 6,000 feet in a desert lava field. While there was no vegetation in the surrounding cinder plain, the cone was a mass of jungle, having escaped the destructive lava flow. The plants were mainly *Acacia koa hawaiiensis*, *Coprosma pubens*, *Styphelia tameiameia*, and *Rubus macraei*. Here the last was not an upright shrub but a huge liana some 20 feet in height with a woody stem 2 inches in diameter. The berries were a dark rich purple 2 inches in diameter, and the plants were spineless. In the fern forests near the volcano of Kilauea, *Rubus macraei* occurs as an epiphyte in the forks of moss-covered trees. It was found to cover many acres on the cool windward slopes of Mauna Kea at an elevation of 6,000 feet. In this locality were found 2 color varieties, dark purple and orange-yellow. The yellow fruits were fully as large as, if not larger than, the purple fruits. The yellow-fruited plants were quite spiny, but the purple-fruited plants were almost spineless, only the young shoots being armed. The purple fruits were slightly bitter, the yellow fruits quite sweet.—The author suggests that hybridization may accomplish much with this species, which seems best adapted to the Pacific slope.—*J. H. Kempton.*

2547. ROSA, J. T., JR. Investigations on the hardening process in vegetable plants. Missouri Agric. Exp. Sta. Res. Bull. 48. 97 p., 7 pl., 9 fig. 1921.—Any treatment checking plant growth increases cold resistance. Hardened cabbage plants contain more "unfree" water, as measured by the dilatometer, than tender plants, the increment corresponding to the extent of growth-checking and to the degree of cold resistance. The actual amount of water unfrozen at any temperature is greater in hardened than in tender leaves, though the total moisture content be less. The percentage of total moisture frozen in leaves increases but the increment decreases as the temperature is lowered. In cabbage the hardening process is associated with a proportional increase in the amount of water unfrozen at  $-5^{\circ}\text{C}$ . Hardened cabbage loses less water by transpiration per unit leaf area than tender. This and the smaller area of hardened plants permits transplanting with less wilting. The rate of water loss in an oven at  $60^{\circ}\text{C}$ . is lower from hardened cabbage leaves than from tender. With tomato, less difference was found, and the rate of loss from hardened cabbage is lower than from tomato subjected to similar treatment. It is concluded that hardening increases water-retaining capacity within the cells. This is associated partly with increased osmotic concentration resulting from decrease in amount of free water but more particularly with increase in pentosan content. Pentosan content of cabbage under hardening treatment increases most rapidly the 1st 5 days. The pentosan content of cabbage, kale, and celery grown in the open increases as the weather becomes colder in the fall. The hot-water soluble pentosan content is closely correlated with water-retaining capacity and hardness, more so than the total pentosan content. In plants susceptible of hardening the hot-water soluble pentosan content is relatively high and increases on hardening treatment; in plants like the tomato which are not susceptible of much hardening, the hot-water soluble fraction is low and does not increase with hardening treatments, though the total pentosan content is appreciable.—*H. D. Hooker, Jr.*

2548. ROSENTHAL, H. Unsere besten Johannisbeer-Sorten für den Erwerbsobstbau. [Our best currant varieties for commercial fruit growing.] Möller's Deutsch. Gärt. Zeitg. 37: 8-9, 19. Fig. 1-8. 1922.—Studies were made to determine the best varieties of currants for commercial purposes. The following red currants are recommended: Rote Holländische (red Dutch), Roter Versailler (red Versaille), Houghton Castle, and Erstling aus Vierlanden. Of white currants are recommended: Weisse Holländische (white Dutch), Weisse Versailler (white Versaille), and Langtraubige Weisse. Of black currants 2 are mentioned: Langtraubige Schwarze, an early, and Goliath, a late variety.—*J. C. Th. Uphof.*

2549. SCHIPPER, J. Birnen am Spalier. [Pears on espaliers.] Gartenwelt 26: 122. Fig. 1-4. 1922.—The variety Sterkmanns is especially recommended for espaliers. The

plants and fruits are less subject to diseases. This variety should be grown as pyramids or standards only in the best situated orchards.—*J. C. Th. Uphof.*

2550. STAVENHAGEN, RICHARD. *Erwerbgärtenbau und Verteuerung des Verkehrswesens.* [Commercial horticulture and increase in cost of shipping.] *Gartenwelt* 26: 81-82, 94-95. 1922.—The author discusses the high cost of shipping ornamental trees, fruit trees, vegetables, and other horticultural products in Germany.—*J. C. Th. Uphof.*

2551. THAYER, PAUL. *Bracing apple trees.* *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 172-175. 4 pl. 1921.—The author points out the great difficulty in shaping trees to avoid splitting when fully developed. It is often possible to intertwine branches to eventually form a natural graft to serve as a brace. Where this method is not possible, the iron rod form of brace has been serviceable.—*R. C. Thomas.*

2552. THEISS, LEWIS, and MARY [THEISS]. *By all means plant nut trees.* *Gard. Mag.* 34: 94-97. 5 fig. 1921.

2553. TRUELLE, A. *Production et commerce des olives.* [Olives, production and trade.] *La Nature* 1922: Suppl. 71-72. 1922.—The topics discussed are: area devoted to olives in France; varieties, including varieties for special purposes; statistics on production in French provinces; and data on prices and exportation.—*J. R. Schramm.*

2554. WATSON, ELBA E. *Weeds in the cranberry bog.* *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [5-7]. 1921.—The best method of complete elimination of weeds is the mechanical removal of the plants, but this is in many cases impossible. *Carex bullata* is best controlled by drainage. Certain ferns can be eliminated by persistent mowing every 2 weeks, or better by pouring concentrated sulphuric acid into the base of each tuft of leaves. Several other weeds are discussed and their control by drainage or mechanical elimination recommended.—*J. K. Shaw.*

2555. WEISS, HARRY B. *Results of a recent survey of the cranberry acreage of New Jersey.* *Amer. Cranberry Growers' Assoc. Proc. Ann. Meeting* 52: 4-9. 1922.—The 1920 Federal Census showed a decrease of 27 per cent from the acreage of 1909. It became definitely known that about 20 per cent of the growers were missed by the Federal enumerators. A survey by the state department of agriculture and experiment station showed a total of 12,205 acres, whereas the Federal census gave 6,533 acres. There were found a total of 227 growers having an average of 54 acres each. The acreage of bearing and non-bearing bogs, of different varieties, also production in 1921 and various statistics of bog management are given.—*J. K. Shaw.*

2556. WESTER, P. J. *Description list of mango varieties in India.* *Philippine Agric. Rev.* 13: 265-352. Fig. 1-71. 1921.

2557. WHITE, E. W. *Strawberry culture.* *British Columbia Dept. Agric. Circ. New Hort. Ser.* 58. 14 p., 25 fig. 1922.

2558. WÜRZNER, O. *Die Düngung der Reben nach den neuesten Erfahrungen.* [Fertilizing grapes in accordance with recent experience.] *Mitteil. Deutsch. Landw. Ges.* 37: Flugbl. 61. 1922.—Popular.—*A. J. Pieters.*

#### FLORICULTURE AND ORNAMENTAL HORTICULTURE

2559. ANONYMOUS. *Planting now for birds the year through.* *Gard. Mag.* 34: 77. 1921.—This article lists plants under the following headings: (1) for summer food supply, (2) affording food in winter, and (3) evergreens that furnish food. The kinds of birds which eat the fruits or seeds of each kind of plant are also given.—*H. C. Thompson.*

2560. ANONYMOUS. The Regal lily for every man's garden. Gard. Mag. 34: 99. 1 fig. 1921.

2561. BARRON, LEONARD. Reconsidering the Camellia. Gard. Mag. 34: 298-299. 3 fig. 1922.

2562. BEACH, JOHN B. The Australian "pine." Florida Grower 25: 6-7. 1922.—*Casuarina* should be more generally planted in Florida. It will thrive in the poorest, driest, windiest, and wet situations. *C. equisetifolia* is rather susceptible to cold. *C. Cunninghamiana* endured a temperature of 20°F. It is immune to attacks of Florida insects, and is recommended for roadside planting.—J. C. Th. Uphof.

2563. BINNEWIES, E. Aufgaben für die Hochzucht der Cyclamen. [Directions on breeding cyclamen.] Gartenwelt 26: 65-68. Fig. 1-10. 1922.—This is a practical treatise on the breeding of cyclamen in Germany.—J. C. Th. Uphof.

2564. BULTEL, G. Note sur la germination des graines d'Orchidées à l'aide du champignon. [Note on the germination of orchid seed with the aid of endophytic fungi.] Jour. Soc. Nation. Hort. France 21: 434-437. 1920.—This article gives the results of various experiments in germinating seed of different species of orchids in various media.—H. C. Thompson.

2565. CALVINO, MARIO. El jardín Cabada de Cienfuegos. [The Cabada garden at Cienfuegos.] Rev. Agric. Com. y Trab. [Cuba] 4: 568-569. 3 pl. 1921.—"The Palms," a private garden at Cienfuegos, offers interesting specimens of tropical vegetation, especially of palms, *Corypha Umbraculifera* L. from Malabar and Ceylon, *Acrocomia lasiocarpa* Mart. from Cuba, and *Latania Loddigesii* Mart. or *L. glaucophylla* Hort. from the island of Mauritius being represented.—G. R. Hoerner.

2566. CALVINO, MARIO. Tratado sobre la multiplicacion de plantas. [A treatise on the propagation of plants.] 284 p., 239 fig. Habana, Cuba. 1920.—The subject is treated under the following main headings: manner of plant multiplication, sexual and asexual; multiplication and propagation; direct multiplication; dissemination and seeding; indirect multiplication. Fully half of the book is given to a careful consideration of sexual propagation. Some of the chapter headings follow: seed purity and methods for its determination; mineral impurities; diaphanoscopic methods; germinability and germinators; constants; calculations relating to the use of mixed seeds; standards of purity; Mendelian ratios; the work of Nilsson; correlation and meteorological influences upon plant characters; seed and seed preparation; methods for obtaining seed from fruit; the chronology of seeding; plans for seeding and arrangement; transplants; protection of the transplanted seedlings; physiological requirements of plants at various stages of seedling development; soil sterilization methods, etc. Multiplication is discussed for bulbs, rhizomes, tubers, stolons, etc. Fumigations and plant treatments, graft affinities, methods of manipulation and execution, waxes, etc., are also discussed. A few remarks upon propagation of non-flowering plants are also appended. There are frequent references to a comprehensive international literature. Although the book is written with warm-climate plants as constant examples, it is a compilation of methods and knowledge for various climates.—A. Bonazzi.

2567. CALVINO, MARIO. Un plátano porta-semilla. [A seed-bearing plantain.] Rev. Agric. Com. y Trab. [Cuba] 4: 570-571. 2 pl. 1921.—A plantain, supposedly *Musa rhodochlamys*, bearing seed was located in the Cabada garden at Cienfuegos. The seed was planted to obtain material for breeding purposes, the object being to secure hybrids having the vigorous growth characters and qualities of resistance to the Panama disease of the seedling parents as well as the valuable fruiting propensities of the other varieties entering into the cross.—G. R. Hoerner.

2568. CAMPBELL, JOHN COLLINS. **Making a lawn that will last.** Stage I.—Soil preparation, grading and fertilizing. Gard. Mag. 34: 254-255. 2 fig. 1922.

2569. CHAMBERLAIN, MONTAGUE. **A handful of top-notch gladiolus.** Gard. Mag. 35: 111-112. Fig 1. 1922.

2570. COLLINS, J. L. **The new craft of making plants to order.** III. What can we do to increase and better the fruit crop. Gard. Mag. 34: 152-154. 3 fig. 1922. .

2571. COOK, W. A. **Ornamental planting.** Florida Grower 25<sup>th</sup>: 7. 1922.—A general account of planting ornamental shrubs in gardens of Florida is given. Shrubs with fine foliage and a somewhat willowy growth are most effective. For background purposes the following are recommended: *Rhodomyrtus*, *Forestiera*, *Eugenia Hookeriana*, *Ilex paraguariensis*, *Thunbergia erecta*, and *Myrtus communis*. For the front, plants of lower and weeping habit and harmonizing in color of bloom, etc., are recommended: *Jasminum pubescens*, *J. gracillimum*, *J. primulinum*, *Plumbago*, *Strobilanthes*, *Viburnum suspensum*, *Eugenia uniflora*, *Triphasia*, *Severinia*, and *Abelia*. For securing an effect of strength in character plants with wide projecting angles are recommended, especially species with a coarse foliage, such as *Pittosporum tobira*, *Prunus Laurocerasus*, *Ligustrum lucidum*, *L. nepalense*, *Michelia fuscata*, *Myrica cerifera*, and *Psidium cattleianum*. Before buildings the use of plants with a coarse wall texture are recommended, as *Hibiscus*, *Allamanda*, *Daedalacanthus*, *Hamelia*, *Tabernaemontana*, and *Viburnum odoratissimum*. *Poinsettias*, with their ragged-stemmed appearance, must be carefully used.—J. C. Th. Uphof.

2572. CORREYON, HENRI. **Bringing alpine plants into our gardens.** II. LOWN, CLARENCE. The lessons of a life-time with mountain plants. Gard. Mag. 34: 316-321. 3 fig. 1922.

2573. DANIELS, MARK. **Shore-line gardens of the Pacific.** Gard. Mag. 34: 181-184. 2 fig. 1921.

2574. EATON, FLORENCE TART. **A little corner in natives—wild flowers that flourish in the shade, giving a foundation planting of graceful informality.** Gard. Mag. 35: 96-97. 2 fig. 1922.—The author discusses the use of native flowers such as *Viola cucullata*, mandrake, ferns, false Solomon's-seal, lady slipper, Canada lily, meadow-rue, wild iris, trillium, Joe-pye weed, black-eyed Susan, goldenrod, and maidenhair fern.—H. C. Thompson.

2575. EDMINISTER, ALLEN W. **What can I grow in the shade?** Gard. Mag. 35: 119. 1922. The following flowering perennials are mentioned as thriving in the shade: cornflower, forget-me-not, godetia, namophila, pansy, and bellflowers. The annuals mentioned are balsam, verbena, stock, basket-flower, clarkia, zinnia. A chart indicates the color of the flowers, the date of seeding, time of flowering, height of plants, and kind of soil required by each.—H. C. Thompson.

2576. FOWLER, CLARENCE. **That elusive element of beauty in the rock garden.** Gard. Mag. 34: 302-304. 2 fig. 1921.

2577. GHENT, W. J. **My Los Angeles suburban garden.** Gard. Mag. 34: 206-208. 3 fig. 1921.

2578. GIBSON, HENRY. **Getting the best bloom from the bulbs.** Gard. Mag. 34: 78-82. 5 fig. 1921.—The author discusses the growing of lilies, daffodils, tulips, hyacinths, crocus, etc., with methods of planting and care of beds.—H. C. Thompson.

2579. GOULD, ALBERT R. **Continuous bloom for the California garden.** Gard. Mag. 34: 177. 1921.—Brief directions for growing annual and perennial herbaceous flowering plants are given.—H. C. Thompson.



2580. GRAMM, F. C. *Meine Richtlinien der Gladiolen-Zucht.* [My directions for gladiolus breeding.] Möller's Deutsch. Gärt. Zeitg. 37: 1-2. Fig. 1. 1922.

2581. GROSSENBACHER, J. G. Toll taken by shade trees. Florida Grower 25<sup>1</sup>: 7. 1922.—Australian pine (*Casuarina*) and *Eucalyptus* are not injurious to Florida grove trees along the highways, but the water oaks (*Quercus laurifolia*) have proved to be very harmful from this standpoint.—*J. C. Th. Uphof.*

2582. HATFIELD, T. D. Trees destroyed by ice in New England. Gard. Mag. 34: 249, 1 fig. 1922.

2583. JAEGER, GERH. *Iris germanica* Treiberei. [Forcing *Iris germanica*.] Möller's Deutsch. Gärt. Zeitg. 37: 38-39. 1922.—The best varieties for forcing are *I. germanica atro-violacea* and *I. germanica Gambetta*. Plants are placed in the hot house from January 15 until February 20 at a distance of 1 m. from the glass. During transplanting from the field the roots must be surrounded by soil. Temperature in the hot house should be 6-8°C., later 10-12°C. Fresh air should be given during sunshine, but the atmosphere must remain moist. Flower stems appear in the middle of March.—*J. C. Th. Uphof.*

2584. JUNGE, H[EINRICH]. *Aster amellus*. Möller's Deutsch. Gärt. Zeitg. 37: 57, 73-74. 1922.—Several garden varieties of *Aster amellus* originated in Germany and other countries are described.—*J. C. Th. Uphof.*

2585. JUNGE, HEINRICH. *Delphinium sulphurium*. Möller's Deutsch. Gärt. Zeitg. 37: 37-39. Fig. 1-2. 1922.—This plant develops tubers and is therefore difficult to propagate by division. It is usually grown from seed. Porous soil is recommended since too much moisture is harmful. Plants begin to flower the 2nd year.—*J. C. Th. Uphof.*

2586. KACHE, PAUL. *Primula Forbesi* und *malacoides*. Gartenwelt 26: 48-48. 1922.—The 2 species are recommended as pot plants. The growing period is conspicuously short, *P. malacoides* flowering within 6-7 months and *P. Forbesi* within 4-5 months. As plants do not expand greatly, small pots only are necessary. The seeds are sown during May-July in seed pans. They should be slightly covered with fine earth after germination. The seedlings must be transplanted and given fresh air. Sometimes it is necessary to transplant twice before putting in final pots. *P. Forbesi* starts flowering the middle of September; *P. malacoides* flowers during the winter.—*J. C. Th. Uphof.*

2587. KACHE, PAUL. *Schizanthus Wisetoniensis*. Gartenwelt 26: 3-4. Fig. 1. 1922.—*Schizanthus Wisetoniensis* is recommended as a pot plant. It flowers 4-6 months after planting the seed, depending on the season of the year.—*J. C. Th. Uphof.*

2588. KELSEY, F. W. The landscape value of trees. Amer. Forestry 28: 47. 1922.

2589. KNEBEL, CURT. *Myosotis* "Hindenburg." Gartenwelt 26: 48-49. 1922.—*Myosotis oblongata* "Hindenburg" is recommended as being resistant to cold (-10-12°C).—*J. C. Th. Uphof.*

2590. KORDES, W. Unsere drei neue Rosenneuheiten für Herbst 1922. [Three rose novelties for autumn, 1922.] Möller's Deutsch. Gärt. Zeitg. 37: 30-31. 1922.—The rose hybrid Wilhelm Kordes (Gorgeous × Adolf Koschel) has brownish red flowers of medium size. Flowers of S.S. Pennock (Mrs. George Sawyer × Lieutenant Chaure) resemble those of Pape Gontier, being borne on long stems. They are recommended for cut flowers and for forcing. Camillo Schneider (Comte. G. de Rochemur × Lieutenant Chaure) is a strong grower with blood-red flowers and is likewise recommended for cut flowers.—*J. C. Th. Uphof.*

2591. KRAUSS. Das Versuchsfeld der deutschen Dahlien-Gesellschaft im Palmengarten in Frankfurt a. M. 1921. [The experimental field of the German Dahlia Society in the Palm-garden at Frankfurt a. M., 1921.] *Gartenwelt* 26: 119-122. 1922.—The year 1921 was very dry, therefore many results were not good. Tests were made of 115 dahlia varieties from 8 firms. Of the newer important varieties are mentioned: Heimat, purple violet flowers, very good; Herzblut, one of the best dark red flowering kinds; Perle von Dresden, with carmin-violet, well filled flowers; Marlitt, which flowers very early and is suitable for bouquets; Hilligensei, conspicuous pink flowers; Artur Lambert (Pompon group), with unusually dark violet flowers; Heinerle (Pompon group), dwarf, with dark purple-red flowers; Eberharde, light scarlet, very early flowering; Iphigenie (a sport of the Goethe), beautiful flowers of wine-red and violet; Cactus, flowers yellow and very large.—J. C. Th. Uphof.

2592. KRUHM, ADOLPH. What, why and how much among the accommodating annuals. *Gard. Mag.* 34: 294-297. 1 fig. 1922.—The subject is treated under the following headings: flowers in an all-season border; what to grow for cut flowers; when it comes to colors; annuals for screens and shade; if your garden is small; for biggest effect in the small garden; the ever-present problem of quantity; words of warning and hints of permanency; and for that shady nook.—H. C. Thompson.

2593. LESKE, A. Chrysanthemum Neuheiten. [Chrysanthemum novelties.] Möller's Deutsch. Gärt. Zeitg. 37: 2. Fig. 1-2. 1922.—As new varieties the author mentions: Erika Leske (strong growth, pink flower with a creamy gloss); Helen von Zimmermann (flowers copper-colored, turned petals, suitable for pot culture and for cut flowers); Elfriede Stiff (flowers yellow center, inside margin of petals white, outside wine-red, large flowering, strong growth); Gruss an Neumühl (flowers orange red, small; recommended for gardens); Lorelei (flowers violet, large, strong growth, recommended for table decoration).—J. C. Th. Uphof.

2594. McDUGAL, D. T. How mountain plants behave when they go to the seaside. *Gard. Mag.* 34: 305-307. 1 fig. 1922.

2595. MIDDLETON, M. S. Planting plans and distances. British Columbia Dept. Agric. Circ. New Hort. Ser. 62. 6 p. 1921.

2596. MITCHELL, SYDNEY B. A Spanish border for California gardens. *Gard. Mag.* 34: 204-205. 1921.

2597. MULFORD, F. L. Broad-leaved evergreen shrubs for the South. *Amer. Forestry* 28: 99-104. 9 fig. 1922.

2598. MÜLLER, GUSTAV. Begonia elatior. Möller's Deutsch. Gärt. Zeitg. 37: 69-70. Fig. 1-2. 1922.—*Begonia elatior* belongs to the winter flowering Ensign group and is easily propagated from cuttings in May. Young plants grow rapidly and flower early and profusely.—J. C. Th. Uphof.

2599. NORTON, J. B. S. What America has done for the Dahlia. II. LYMBERRY, ELIZABETH. The Dahlias apotheosis in the Sunset State. *Gard. Mag.* 34: 192-197. 11 fig. 1921.

2600. OLIVE, CHARLES. Winter housing for roots and bulbs. *Gard. Mag.* 34: 88. 1921.

2601. PIFFL, HUGO. Die Gärtnerei in Bosnien und Herzogowina. [Horticulture in Bosnia and Herzogowina.] *Gartenwelt* 26: 144-146. 1922.

2602. RAWLINSON, ANNIE COCHRAN. Trees that best resist ice storms. Gard. Mag. 34: 103-104. 1921.—The author places horse chestnut, oak, shagbark hickory, and red maple at the head of the list. Those most easily injured are willow, poplar, paulownia, white birch, silver maple, and white ash. Evergreens mentioned as being very resistant to ice injury are spruces, firs, junipers, white pine, and pitch pine.—*H. C. Thompson.*

2603. SAKAMOTO, KIYOSHI. Following the chrysanthemum to the land of its inheritance. Gard. Mag. 34: 133-135. 5 fig. 1922.

2604. SEIDEL, T. J. Sind auf Rhododendron veredelten Azaleen zur Fröhltreiberei verwendbar? [Are Azaleas grafted on Rhododendron stock suitable for early forcing?] Gartenwelt 26: 28. 1922.—Azaleas grafted on Rhododendron Cunningham White are very suitable for early forcing, especially the varieties Deutsche Perle, Simon Mardner, Paul Schame, Emile Liebig, Eggebrechti, Herme, and Fritz Seidel.—*J. C. Th. Uphof.*

2605. STANTON, CARL. Making a garden plan for yourself. Gard. Mag. 34: 233-236. 7 fig. 1922.—The author discusses location of house and garages, garden, etc., and arrangement of ornamental plantings.—*H. C. Thompson.*

2606. STANTON, CARL. Winter quarters for tender perennials, etc. Gard. Mag. 34: 88-89. 1921.—The author describes a storage room for various plants and plant products, and gives a chart showing planting date, storing date, storage temperature, location in storage room, and methods of storing various vegetables and flowers.—*H. C. Thompson.*

2607. STILES, E. C. Tying the house to the garden. Gard. Mag. 35: 99-104. 6 fig. 1922.—The author discusses various types of plantings to make the dwelling fit into the picture.—*H. C. Thompson.*

2608. STOLDT, C. Die Handelswichtigsten Typen meiner Cyklamenzucht. [The most important commercial types of my cyclamen breeding.] Gartenwelt 26: 76. Fig. 1-8. 1922.—In breeding cyclamen the shape and color of the flowers, richness of flowering, compact but strong growth, and color of leaves are of much importance. Cyclamen Rosa von Marienthal originated in 1883; Kätchen Stoldt in 1890; Ruhm von Wansbek and Rosa von Wansbek in 1906; Feurling Lachsrot is of recent origin. The 9 figures show different types of flowers.—*J. C. Th. Uphof.*

2609. THEISS, L. E. Hedges out of the ordinary. Amer. Forestry 27: 689-693. 7 fig. 1921.—Hedges of garden currant, European filbert, gooseberry, blackberry, and dwarf pear are advocated for beauty and utility.—*Chas. H. Otis.*

2610. THORNE, HELEN S. When an Easterner gardens in the Golden West. Gard. Mag. 34: 178-180. 5 fig. 1921.

2611. WILD, HENRY. Evergreens that keep green in winter. Gard. Mag. 34: 90-93. 3 fig. 1921.

2612. WILDER, LOUISE B. Bringing alpine plants into our gardens. III. Rock plants and alpine raised from seed. Gard. Mag. 34: 320-321. 1922.

2613. WILDER, LOUISE B. Old-fashioned gardens that continue to charm. Gard. Mag. 34: 130-133. 2 fig. 1922.

2614. WOODMAN, ALLISON MORRIS. Picturesque values of Eucalyptus. Gard. Mag. 34: 199-201. 4 fig. 1921.

2615. ZORNITZ, H. Mehr Statice. [More statice.] Möller's Deutsch. Gärt. Zeitg. 37: 73. Fig. 1. 1922.—Near Bad Rastenberg, Thüringen, *Statice incana hybrida* and *S. tatarica* are grown in large quantities for the winter, the yearly harvest being 9,000-10,000 kgm.—J. C. Th. Uphof.

## VEGETABLE CULTURE

2616. ANONYMOUS. Sortenanbauversuche mit Frühkarotten in Jahre 1921. [Variety studies with early carrots in 1921.] Mitteil. Deutsch. Landw. Ges. 37: 107-108. 1922.—In this report of comparative tests of the varieties "Pariser Markt" and "Duwiker" made at 5 stations, most of the data are given in tabular form.—A. J. Pieters.

2617. DUCOMET, V. De la dégénérescence des végétaux multipliés par voie asexuée. (En particulier de la pomme de terre.) [Degeneration of vegetables propagated by asexual means. With particular reference to the potato.] Jour. Soc. Nation. Hort. France 22: 255-273. 1921.

2618. GANG, MAX. Gurkenkultur in kalten Kasten. [Cucumber growing in cold frames.] Möller's Deutsch. Gärt. Zeitg. 37: 9-10, 25-26. 1922.

2619. KEIL, J. B. Variety trials of lettuce. Monthly Bull. Ohio. Agric. Exp. Sta. 6: 139-148. 1921.—A brief, concise, and comprehensive discussion, on the basis of extensive variety trials, is given of the relative merits and weaknesses of 16 of the more desirable varieties of lettuce of the head, leaf, and cos types.—R. C. Thomas.

2620. KERLE, W. D. Onion-growing in New South Wales. Agric. Gaz. New South Wales 33: 53-55. 1922.—Onions yielded up to 12.85 tons per acre at Dorrigo. Notes on varieties and methods of culture are given.—L. R. Waldron.

2621. ROUNDS, ARTHUR W. Tomato growing. Bull. Delaware State Bd. Agric. 10<sup>3</sup>: 70-72. 1921.—The author reports 29.5 tons from 2 acres, grown at a cost of 12.26 per ton. A detailed report of items is given.—T. F. Manns.

2622. RUTLEDGE, A. Possibilities of potted cauliflower. Gard. Mag. 34: 106. 1921.

2623. STEED, THOS. J. Seed sowing. Charts for the western gardener. Gard. Mag. 34: 185-186. 1921.—The author discusses annual flowering plants for the region west of the Cascades and gives a chart showing depth to cover seed, spacing, and time to plant, manure and fertilizers per square yard, etc., for a long list of annuals. Similar information is given for vegetables for Central and Western States. The chart for vegetables includes the number of days to maturity, suggested varieties, and planting directions.—H. C. Thompson.

2624. WHITE, THOS. H. The future of the tomato growing industry. Bull. Delaware State Bd. Agric. 10<sup>3</sup>: 64-70. 1921.—The author reviews prices, cultures, and canning practices on the Delaware-Chesapeake Peninsula, and recommends more intensive culture, smaller acreage, better manured and fertilized land, and early hot-bed-grown plants.—T. F. Manns.

2625. YOUNG, ROBERT A. Forcing and blanching dasheen shoots. U. S. Dept. Agric. Dept. Circ. 125. 6 p., 5 fig. 1920.—The culture and uses of dasheen are discussed.—L. R. Hester.

## MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 2100, 2170, 2179, 2245, 2282, 2296, 2297, 2491, 2722, 2836, 2917, 2976, 2977, 3071, 3085, 3214, 3228, 3242, 3258)

2626. ANONYMOUS. An "oven plant." *Sci. Amer. Monthly* 3: 518. 1921.—The pollination mechanism of *Arum maculatum* is described.—*Chas. H. Otis*.

2627. ANONYMOUS. Graft hybrids. *Nature* 109: 27-28. 1922.—Instances of this phenomenon (from paper by Weiss at British Association) are given.—*O. A. Stevens*.

2628. BARKER, E. E. The architecture of the coco palm. *Nat. Study Rev.* 18: 44-50. 1922.—A popular account is given of the gross anatomy of the tree and fruit.—*W. L. Eikenberry*.

2629. DASTUR, R. H. Notes on the development of the ovule, embryo sac and embryo of *Hydnora africana* Thunb. *Trans. Roy. Soc. South Africa* 10: 27-31. *Fig. 1-13*. 1921.—The ovule of *Hydnora* is orthotropous with a single integument. The megaspore mother cell is hypodermal and becomes the embryo sac. The proembryo consists of a row of about 15 cells. The embryo is produced from the middle region of the proembryo and no differentiation had taken place in the latest stages seen.—*E. M. Doidge*.

2630. GILLIES, C. D., and C. T. WHITE. On the occurrence of abortive styles in *Buckinghamia celsissima*. *Proc. Roy. Soc. Queensland* 31: 42-45. *Fig. 1-2*. 1920.—In 1918 Longman and White described a mutant of *Buckinghamia celsissima* [see Bot. Absts. 1, Entry 912]. The flowers of this species normally possess a semi-annular hypogynous gland situated at the base of the stipes, but in the mutant the gland is divided into a number of segments and 2 accessory styliform structures accompany the pistil. As the result of anatomical studies, the authors conclude that the styliform structures are really abortive styles and not segments of the hypogynous gland as maintained by Longman and White, and that their development has caused splitting of the hypogynous gland into distinct segments.—*J. H. Faull*.

2631. JANSE, J. M. Ein Blattsteckling von *Camellia japonica* mit Adventivknospe. [A leaf-cutting of *Camellia japonica* with adventive bud.] *Flora* 114: 401-404. 1 *fig.* 1921.—A leaf-cutting of *Camellia japonica* at the end of 1 year had produced 2 roots and after 2½ years gave rise to a leafy shoot.—*A. G. Stokey*.

2632. LANSDELL, K. A. Weeds of South Africa VI. *Jour. Dept. Agric. Union South Africa* 4: 542-549. *Pl. 1-6*. 1922.—An account is given of the structure and life history of the spear thistle, *Cnicus lanceolatus* L.—*E. M. Doidge*.

2633. OSBORNE, T. G. B. Some observations on *Isoetes Drummondii*, A. Br. *Ann. Botany* 36: 41-54. 15 *fig.* 1922.—*Isoetes Drummondii*, a small species recorded from widely separated places in Australia, grows in soil which is wet but not submerged in the rainy season and baked hard in the dry season. The stock which is buried in the soil is trilobed, the projecting portion of each lobe being built up of a number of caps which represent the whole of the leaf- and root-bearing portions developed in previous seasons. The caps are cut off as a result of the regular alternation of well-marked growing and resting seasons. At the approach of the dry season the leaves dry up leaving their tough bases and the sporangia attached to the stock and buried in the soil. By this time pads of mucilage cells have been formed at the bases of the sporophylls. At the beginning of the following rainy season the mucilage cells absorb water, expand tremendously, and force the leaf bases with their sporangia through the soil to the

surface. The opening of the sporangium depends on a difference in tension between the inner and outer surfaces of the wall following the absorption of water. It ruptures, is torn away from the sporophyll, and rapidly rolls up inside out.—*W. P. Thompson.*

2634. PLANTEFOL, LUCIEN. Sur des épis tératologiques du *Plantago lanceolata* L. [On abnormal inflorescences of *Plantago lanceolata*.] *Compt. Rend. Acad. Sci. Paris* 173: 1108-1111. 1921.—The paper presents a classification of the abnormal inflorescences of this species as follows: (1) Phyllody of the bracts; bracts fewer in number and developing similarly to the leaves of the rosette. (2) Abortion of flowers of the spike. (3) Presence of secondary spikes inserted on the primary ones. (4) Modification of the pubescence of the axis of the spike.—*C. H. Farr.*

2635. SPRAGUE, T. A. The seedling foliage of *Ulex Gallii*. *Jour. Botany* 60: 6-12. 1922.—A detailed study was made of 500 seedlings of *Ulex Gallii* to find about how long the compound leaves persisted. Among the results obtained were the following: 96.6 per cent of the seedlings bore from 1 to 11 compound leaves after the cotyledons and before the continuously simple leaves appeared; 48.8 per cent had both leaves of the 1st pair trifoliate and all the following simple; no compound leaves were found after the 6th pair and many variations in the numbers of trifoliate and bifoliate leaves occurred.—*Adele Lewis Grant.*

2636. TAYLOR, WM. RANDOLPH. The embryogeny of *Cyrtanthus parviflorus* Baker. *Amer. Jour. Bot.* 8: 502-506. 2 pl. 1921.—The structure and development of the embryo in this species were studied from fertilization to the mature seed. The cotyledon originates as a terminal structure and is always single. The development of the embryo is essentially like that of typical monocotyledons. This species of *Cyrtanthus* is therefore quite different in its embryological history from *C. sanguineus* as described by Farrell and by Coulter and Land, where the very young embryo has a cotyledonary tube surmounted by 2 growing points, 1 of which finally greatly surpasses the other and becomes the cotyledon. The conclusions as to the character and evolutionary history of the cotyledon of monocotyledons which have been drawn from *C. sanguineus* are therefore not supported by conditions in *C. parviflorus* although the 2 species are closely related taxonomically.—*E. W. Sinnott.*

2637. THOMPSON, H. STUART. *Carex* forms with long peduncles. *Jour. Botany* 60: 12-13. 1922.—The author notes that several species of *Carex* occasionally produce long-peduncled flowers. The specimens noted were collected in England.—*Adele Lewis Grant.*

2638. TURRILL, W. B. Abnormal flowers in *Eranthis*. *Ann. Botany* 36: 131-133. 12 fig. 1922.—A specimen of *Eranthis cilicica* grown in a pot showed many floral abnormalities such as honey glands with expanded blades and combined stamens and carpels. In some cases ovules and anther lobes with good pollen were borne in the same structure, the ovules frequently being in an open carpel with style above the anther lobes.—*W. P. Thompson.*

2639. WILLIAMSON, HELEN STUART. Some experiments on the action of wood on photographic plates. *Ann. Botany* 36: 91-100. Pl. 11. 1922.—Specimens of wood when placed in contact with a photographic plate have a definite action on the plate due to their giving off hydrogen peroxide. The plate on being developed shows a picture of the wood. In some cases the spring wood is active and the summer wood without effect while in other cases the reverse is true. It was not found possible to utilize this action to identify woods, to recognize kiln dried or drastically heated timber, to determine the amount of moisture, or to detect incipient decay.—*W. P. Thompson.*

## MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 2230, 2238, 2265, 2288, 2292, 2841, 3020, 3193)

2640. ANONYMOUS. *Note*. *Nature* 106: 739. 1921.—Note on algae and other plants in Birmingham reservoir.—O. A. Stevens.

2641. CHODAT, R. *Algues de la region du Grand St-Bernard*. *Bull. Soc. Bot. Genève* 12: 293-305. *Fig. 1-10*. 1920.—The new genera and species of algae described and figured include: *Chlamydomonas cylindrica*, *C. bernardiensis*, *C. pteromonoides*, *C. polydactyla*, *Chlorogonium bernardinense*, *Lobomonas bernardiensis*, *Cyanospira* n. gen., *C. eugleninearum*, *C. aeruginosa*, *Chrysosphaera* n. gen., *C. bernardinensis*, *Bernardinella* n. gen., *B. bipyramidata*, *Pseudomallomonas* n. gen., and *P. bernardinensis*.—W. H. Emig.

2642. CHODAT, R. *Sur un nouveau genre d'algues: genus Interfilum Chodat*. *Bull. Soc. Bot. Genève* 12: 149. 1920.—An announcement of a new genus of algae which will be described in detail in a later issue of the bulletin.—W. H. Emig.

2643. CORTI, EGIDIO. *Il lago del Segrino. Note di biologia lacustre*. [Lake Segrino. *Note on lacustrine biology*.] *Nuova Notarisia* 31: 161-166. 1920.—Notes are given on the plant and animal life of an Italian lake at an elevation of 374 m. above the sea. Brief lists of Spermatophyta, Musci, Pisces, Mollusca, and Insecta are followed by somewhat longer lists of the phytoplankton and zooplankton, including Schizophyceae, Dinoflagellata, Chlorophyceae, Desmidiaceae, Diatomaceae, Copepoda, Phyllopoda, Rotifera, and Rhizopoda.—Marshall A. Howe.

2644. CUNHA, ARISTIDES MARQUES DA, et O. DA FONSECA. *Le microplankton des côtes meridionales du Brésil*. [The microplankton of the southern coast of Brazil.] *Mem. Inst. Oswaldo Cruz* 10: In Portuguese 104-173; in Translations 78-82. 1918.—A list of 75 species (32 diatoms and the rest flagellate forms) of the microplankton of the southern coast of Brazil, together with notes on localities, is given.—L. H. Tiffany.

2645. DELF, ELLEN MARION, and MARGARET R. MICHELL. *The Tyson collection of marine algae*. *Ann. Bolus Herb.* 3: 89-119. 1921.—A systematised list is given of marine algae collected by W. Tyson along the shores of the Cape Province and Natal, chiefly from Algoa Bay, the Kowie, the Kei mouth, and the Cape Peninsula.—E. M. Doidge.

2646. EVANS, E. D. *Mounting freshwater algae, mosses, etc.* *Jour. Quekett Microsc. Club* 14: 225-228. 1921.—Various methods of preserving green plants so as to retain their color are reviewed and the use of zinc acetate in the place of the copper acetate in general use in such preservatives is advocated. Full directions are given.—L. B. Walker.

2647. GARDNER, NATHANIEL LYON. *The genus Fucus on the Pacific Coast of North America*. *Univ. California Publ. Bot.* 10: 1-180. *Pl. 1-60*. 1922.—The author discusses first the various possibilities of treatment of the variations in form and structure found among the members of the genus *Fucus*, particularly of those occurring on the Pacific Coast of North America. He announces the discovery of new structures, "caecostomata," or cryptostomata which never open, and discusses their relative importance in classification. On the basis of this discussion he arranges the members of the genus *Fucus* of the Pacific coast of North America under 5 major species, containing respectively 13, 0, 5, 6, and 21 forms. Practically all of the 45 forms are illustrated by photographs. The following are proposed as new: *f. typicus*, *f. angustus*, *f. linearis*, *f. abbreviatus*, *f. cornutus*, *f. nigricans*, *f. elongatus*, *f. luxur-*

*rians*, f. *reflexus*, f. *rigidus*, f. *latifrons*, f. *contortus*, and f. *variabilis* under *Fucus furcatus* Ag.; *Fucus nitens*; f. *hesperius*, f. *divergens*, f. *costatus*, f. *acutus*, f. *divaricatus* under *Fucus edentatus* De la Pyl.; f. *abbreviatus*, f. *acuminatus*, f. *obtusus*, f. *typicus*, f. *limitatus*, and f. *latissimus* under *Fucus membranaceus*; and f. *cuneatus*, f. *ecostatus*, f. *oregonensis*, f. *marginatus*, f. *flabellatus*, f. *intermedius*, f. *magnificus*, and f. *stellatus* under *Fucus evanescens* Ag.—W. A. Setchell.

2648. GROVES, J. Charophyta from Annam and Guam. Philippine Jour. Sci. 19: 663-664.  
1921.—Critical notes on 2 species of *Nitella* and 2 of *Chara* are given; no new names appear.—E. D. Merrill.

2649. HARRIS, G. T. The desmid flora of a triassic district. Jour. Quekett Microsc. Club 14: 137-162. 1920.—The collecting regions are described and 429 species listed.—L. B. Walker.

2650. HARTMAN, M. VON. Ergebnisse und Probleme der Protistenkunde. In: Festschr. K. Wilhelm Ges. zur Förderung der Wissenschaften zu ihrem zehnjährigen Jubiläum dargebracht von ihren Instituten. Julius Springer: Berlin, 1921.

2651. HUSTEDT, FRIEDRICH. Zellpflanzen Ostaficas, von Bruno Schröder: VI. Bacillariales. [The Algae of East Africa, by Bruno Schröder: VI. Bacillariales.] Hedwigia 63: 117-160. Fig. 1-25. 1921.—A general and a systematic account is given of the Diatoms of East Africa as shown by an examination of 38 samples collected in various habitats from 5 districts along the coast. Some samples contained numerous forms and others few, thus giving some indication of the abundance and geographical distribution of Diatoms in this region. There were identified from the 38 samples 248 forms, representing 41 genera and 190 species. Seven species and 5 varieties are described as new, as follows: *Achnanthes subhudsonis*, *A. ezigua* Grün. var. *constricta*, *Caloneis aequatoriales*, *C. aequatoriales* var. *capitata*, *Neidium inconspicuum*, *Pinnularia amaniensis*, *Navicula kwamkuji*, *Amphora Schroederi*, *Nitzschia Goetzeana* O. Müll. var. *gracilior*, *N. lacustris*, *Hantzschia amphioxys* (Ehr.) Grün. var. *africana*, *H. amphioxys* (Ehr.) Grün. var. *distincte-punctata*.—L. H. Tiffany.

2652. LEWIS, I. F., and W. R. TAYLOR. Notes from the Woods Hole laboratory.—1921. Rhodora 23: 249-256. Pl. 133, fig. 1-2. 1921.—Notes are presented on observations on the morphology and taxonomy of *Platymonas subcordiformis* (Wille) Hazen. Also observations made on the following algae are briefly recounted: *Asterococcus superbus* (Cienk.) Scherf., *Anabaena spiroides* var. *crassa* Lemm., *Bryopsis hypnoides* Lamx., *Ectocarpus Mitchellae* Harv. var. *parva* n. var. The junior author adds also a note in regard to the introduction of *Baptisia bracteata* (Muhl.) Ell. into the Woods Hole region. This species is indigenous only as far as Michigan and this seems to be the 1st record of its occurrence in New England.—James P. Poole.

2653. LITTLE, H. P. What do you know about diatoms? Sci. Amer. Monthly 4: 77-78. 1922.

2654. LUTZ, ADOLFO, H. C. DE SOUZA ARDUJO, and O. DA FONSECA. Report on the journey from the river Paraná to Assuncion and the return journey over Buenos Aires, Montevideo, and Rio Grande. Mem. Inst. Oswaldo Cruz 10: In Portuguese 99-103; in Translations 83-102. 56 pl. 1918.—The major discussion is zoological and climatological. A list of 59 species of flagellates and diatoms collected from the coast of Uruguay up to the state of Santa Catharina is given. Some notes appear on the nature of the vegetation seen along the shores of the Upper Paraná River.—L. H. Tiffany.

2655. MAZZA, ANGELO. Aggiunte al saggio di algologia oceanica. [Appendix to the essay on oceanic algology.] Nuova Notarisa 31: 1-64. 93-160. 1920.—The author continues his



studies of Florideae supplementary to his *Saggio di Algologia Oceanica*, published serially in *Nuova Notarisa* from 1905 to 1918. The species particularly described or discussed are; *Acanthopeltis japonica*, *Hennedya crispa*, *Iridaea latissima*, *Besla papillaeformis*, *Gigartina tristis*, *G. brachiata*, *G. clavifera*, *G. angulata*, *G. alveata*, *G. ancistroclada*, *G. tuberculosa*, *G. cincinnalis*, *G. mamillata*, *G. Radula*, *G. Burmannii*, *G. atropurpurea*, *G. insignis*, *G. Chamissoi*, *Gymnogongrus furcellatus*, *G. disciplinalis*, *G. glomeratus*, *G. crenulatus*, *G. vermicularis*, *G. Turqueti*, *Stenogramma interruptum*, *Mychodea terminalis*, *M. cornosa*, *M. pusilla*, *Callophyllis discigera*, *C. calliblepharoides*, *C. Hombroniana*, *Microcoelia chilensis*, *Ectophora depressa*, *Polycoelia fastigiata*, *P. laciniata*, *Callymenia cribrata*, *C. schizophylla*, *C. antarctica*, *C. oblongifurcata*, *Turnerella Mertensiana*, *T. Pennyi*, *Meristotheca Duchassaingii*, *M. Fergussonii*, *Anatheca Montagnei*, *A. furcata*, *Craspedocarpus erosus*, *Gloiophyllis Barkeriae*, *Rhodophyllis acanthocarpa*, and *R. membranacea*.—Marshall A. Howe.

2656. OYE, PAUL VAN. *Kurzer Beitrag zur Kenntnis von Pithophora sumatrana* (Mart.) Wittr. [A short contribution to a knowledge of *Pithophora sumatrana*.] *Hedwigia* 63: 43-47. Fig. 1-2. 1921.—Seen frequently in 1917, in the region about Batavia, Java, this peculiar alga attracted attention, which led to an investigation of its life-history. The study was based on fresh material collected in November and December, and careful measurements were made of the diameter of the main filaments and the branches. The main filament varied from 48 to 77  $\mu$  against 105 to 150  $\mu$  given by Wittrock, 100 to 140  $\mu$  given by Möbius, and 85 to 140  $\mu$  given by Ernst. Oye's material was found in ditches near the coast where the water was usually salty, giving somewhat unusual life conditions. Taking his measurements with those of others, he concludes that the main axes vary in diameter from 48 to 140  $\mu$ . Twelve species from the genus vary from 65 to 175  $\mu$ , and the one species shows thus almost as much variation in diameter of the filaments as all of the species. Therefore, size of filaments cannot serve as diagnostic characters for the species.—The akinetes were found to be intercalary more commonly. Yet terminal akinetes were not rare, and the terminal cell seemed quite as likely to become differentiated into an akinete as any other single cell of the filament. Indeed, nearly all mature filaments showed terminal akinetes. The numbers of terminal and intercalary akinetes were 14 and 46 respectively in 10 specimens examined. The earlier-formed akinetes are intercalary, and it may be that in 2 filaments in which terminal akinetes were lacking this was due to immaturity of the filaments.—From his own observations and those of others, he believes that the species develops during 2 periods for each year in the East Indian lowlands. The periods are March and April, and October, November, and December.—Bruce Fink.

2657. P[ARTHASARATHY IYENGAR], M. O. [Rev. of: HODGETTS, WILLIAM J. A new species of *Spirogyra*. *Ann. Botany* 34: 519-524. 1920 (see Bot. Absts. 8, Entry 1233).] *Jour. Indian Bot.* 2: 322. 1921.

2658. SISMEY, E. D. A contribution to the algal flora of the Okanagan (British Columbia). *Canadian Field Nat.* 35: 112-114. 1921.—The list of 65 species of algae collected in one of the Canadian rivers includes 21 species of Myxophyceae, 41 of Chlorophyceae, and 3 of Phaeophyceae.—W. H. Emig.

## MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

A. W. EVANS, *Editor*

(See also in this issue Entries 2228, 2229, 2230, 2231, 2238, 2245, 2270, 2275, 2276, 2289, 2293, 2298, 2308, 2309, 2643, 3261)

2659. AMANN, J. L'indice cellulaire chez les Muscinées. [The cellular index in bryophytes.] *Rev. Bryologique* 48: 33-38. 1921.—The author emphasizes the fact that cell-measurements are often of importance in distinguishing between closely related species of

bryophytes. Measurements of leaf cells are most frequently employed for this purpose, both the length and the width of the cells being usually given. Amann recommends, instead of this method, the use of the "cellular index," which signifies the average number of cells per square millimeter of surface. He gives definite directions for determining this index and then illustrates its value by tabulating, as concrete examples, the cellular indices of 2 closely related species of *Pissidens* and of the 25 European species of *Mnium*. In certain species hygrophilous and xerophilous races occur, in which the indices differ somewhat, but in most cases the values are fairly uniform. The cellular index may be determined for other organs than leaves, such as the exothecium of the capsule, but the distinctions thus obtained are rarely of much constancy. [See also Bot. Absts. 11, Entry 460.]-A. W. Evans.

2660. DIXON, H. N. *Rhacopilopsis trinitensis* E. G. Britt. & Dixon. Jour. Botany 60: 86-88. 1922.—The author discusses various critical opinions regarding this widely distributed moss, which is known from numerous localities in tropical America and Africa. The name applied to it represents a new combination, the oldest name for the species being *Hypnum trinitense* C. M. (1851). At the close of the paper a full synonymy is given.—Adele Lewis Grant.

2661. DOPOSCHEG-UHLÁR, JOSEF. Versuche über die Umwandlung von Antheridienständen in den vegetativen Thallus bei Marchantien. [Experiments dealing with the transformation of antheridial receptacles of the Marchantieae into vegetative thalli.] Flora 113: 191-198. Pl. 7, 3 fig. 1920.—Experiments were carried on with the male receptacles of *Marchantia planiloba* Steph., *M. palmata* Nees, and the common *M. polymorpha* L. in the attempt to induce a resumption of growth in the branches or lobes. The most interesting results were obtained with *M. planiloba*, an African species in which the lobes are unusually long. When the receptacles were cut off and placed with the lower surface of the disc in contact with moist peaty earth, the lobes began to elongate at their apices. In some cases a succession of new antheridia was developed; in other cases the prolongations of the lobes were vegetative in character, producing cupules of the ordinary type; in still other cases structures intermediate between the antheridial cavities and cupules were formed before normal vegetative growth was finally resumed. The author attributes the renewal of growth to the removal of an inhibitory stimulus and associates the various types of development with the formation of rhizoids in greater or less number, various nutritive conditions being thus brought about. In the case of *M. palmata*, an Asiatic species, the lobes could be induced to continue the formation of antheridia but not to revert to a vegetative condition; in *M. polymorpha* no renewal of growth could be secured.—A. W. Evans.

2662. EVANS, ALEXANDER W. Notes on New England Hepaticae,—XVI. *Rhodora* 23: 281-284. 1921.—The following 2 additions to the flora of New England are discussed: *Nardia fassombronioides* (Aust.) Lindb., found in Connecticut, an extension of range north from New Jersey; and *Scapania hyperborea* Jörgensen, found in the mountains of Maine and New Hampshire, these being the first North American stations south of Greenland. Other additions to the Maine flora are *Lunularia cruciata*, *Calypogeia fissa*, *C. Sullivantii*, *Cephalozia bifida*, *Radula obconica*, and *Scapania paludosa*. Additions to the Vermont flora are *Fossombronia foveolata*, *Cephalozia bifida*, *Nardia obovata*, *Plagiochila Austini*, and *Anthoceros crispulus*.—M. L. Fernald.

2663. EVANS, WILLIAM. Some moss records from St. Kilda. Trans. Bot. Soc. Edinburgh 28: 67-69. 1921.—The author lists 32 species of mosses from St. Kilda, an island of the Hebrides group, the list being largely based on specimens collected by J. Waterston and W. E. Clarke. Three of the species are not cited from the vice-county of the Outer Hebrides in the 1907 "Census" of British mosses.—R. S. Ferris.

2664. GIBBS, S. S. The genus *Calobryum*. Jour. Botany 58: 275. 1920.—Attention is called to the fact that the genus *Calobryum* contains 4 species instead of 3, as stated by Camp-

bell in a paper recently published [see Bot. Absts. 8, Entry 446]. The 4th species is *C. Gibbesiae* Steph. of New Zealand.—A. W. Evans.

2665. GYÖRFFY, ISTVÁN. *Miscellanea bryologica Hungarica. I—V.* [Miscellanea on Hungarian bryology.] Bot. Közlemenyek 19: 7-16, (1)-(2). 18 fig. 1920.—The author contributes 5 notes on Hungarian bryophytes. In the 1st he reports the fungus *Cladosporium herbarum* in the capsules of 6 different species of mosses. In the 2nd he notes the occurrence of *Saelania caesia* at the unusual elevation of 2000 m. and describes a filamentous waxy excretion of the leaves. In the 3rd, 4th, and 5th he cites new Hungarian stations for *Sphaerocephalus turgidus*, *Conostomum tetragonum*, and *Bucegia romanica*, respectively, describing in the case of the last species the marginal portion of the thallus. The figures illustrate capsules affected by the *Cladosporium*, the waxy secretion of the *Saelania*, and the marginal cells of the *Bucegia*. The article is written in Hungarian but has a German résumé, from which the present abstract has been prepared.—A. W. Evans.

2666. HERZFELDER, HELENE. *Experimente an Sporophyten von Funaria hygrometrica.* [Experiments on sporophytes of *Funaria hygrometrica*.] Flora 114: 385-393. 3 fig. 1921.—In the described experiments the calyptras were removed from sporophytes of *Funaria hygrometrica* in various stages of development. An enlargement of the seta was thus induced, and the capsules formed tended to be erect and more or less radial. In one case an abnormal development of the archesporium was observed, a layer of sporogenous tissue extending across the upper part of the columella.—A. W. Evans.

2667. IRMSCHER, E. *Neue Fissidens-Arten aus Brasilien und Bolivien.* [New species of Fissidens from Brazil and Bolivia.] Notizbl. Bot. Gart. u. Mus. Berlin 7: 533-537. 1921.—The following new species of *Fissidens*, all from the collections of E. Ule, are described: *F. acreeanus*, *F. Georgianus*, *F. hylophilus*, and *F. surumuensis* from Brazil; *F. Ernestii* and *F. terricola* from Bolivia.—H. A. Gleason.

2668. KRAUSE, ERNST H. L. *Rostocker Moosflora: Verzeichnis der bis 1920 aus der Nordostecke Mecklenburgs bis Bukspitze, Warnow, Güstrow, Sülze bekannt gewordenen Moosarten.* [Moss flora of Rostock: enumeration of the species of bryophytes reported up to 1920 from the northeastern corner of Mecklenburg as far as Bukspitze, Warnow, Güstrow and Sülze.] 8 vo., 16 p. Rostock, 1920.—In the introduction the author indicates the collections upon which his report is based, gives a list of abbreviations and tabulates the 34 genera that he recognizes. He then enumerates the bryophytes from the portion of Mecklenburg bounded roughly by the 4 localities mentioned in the subtitle. Under each species data regarding stations are recorded, together with occasional critical remarks. The list includes 302 species, of which 15 are peat mosses, 231 true mosses, and 56 hepatics. Under certain species 1 or more subspecies or species of a secondary rank are cited. The genera are understood in a very broad sense; the genus *Jungermannia*, for example, includes the order Jungermanniales of most recent writers, while *Hypnum* is made up of the Linnaean genus *Hypnum*, together with *Bryum* and several other genera. This procedure has necessitated the formation of several new combinations, but these are difficult to distinguish, owing to the omission of synonyms and of authors' names after the species.—A. W. Evans.

2669. KRAUSE, ERNST H. L. *Rostocker Moosflora: Nachträge bis Ende des Jahres 1921.* [Moss flora of Rostock: additions up to the close of the year 1921.] 8 vo., 4 p. Rostock, 1921.—[See preceding entry.] In this supplement to the Moss flora of Rostock the author adds 5 peat mosses, 15 true mosses, and 11 hepatics and gives further data regarding some of the species in his original article. He now understands *Hypnum* in a somewhat narrower sense, *Bryum* being separated as a distinct genus, and again forms a number of new combinations.—A. W. Evans.

2670. MALTA, N. *Versuche über die Widerstandsfähigkeit der Moose gegen Austrocknung.* [Investigation of the resistance of mosses to desiccation.] Latvijas Augstskolas

Raksti [Acta Univ. Latviensis] 1: 125-129. Fig. 1-5. 1921.—Many xerophilous mosses, especially Grimmiaceae, possess living cells even after many months in the herbarium. Material of many species was taken from herbarium specimens, placed in Erlenmeyer flasks of nutrient solution, and left standing in the laboratory window. Many cases of renewed growth were observed, though negative results are not conclusive owing to lack of data upon method of drying the specimens for the herbarium. Irmischer's conclusion that dormant buds rather than apical cells regenerate is in the main true, but in 2 cases apical cells showed renewed growth, one even after 4 years in the herbarium. Renewed growth seems to occur more readily in summer. The new growth may be in the form of rhizoids which develop brood bodies, secondary protonema, or actual vegetative shoots. Some stems of *Anoetangium compactum* developed rhizoids and chloronema even after 19 years in the herbarium. Other mosses, notably *Amblystegium compactum*, show ready germination of brood cells after desiccation. Spores of mosses show the greatest resistance to drought; those of *Grimmia pulvinata* germinated after remaining almost 70 years in the herbarium. A bibliography of 5 titles is given.—E. B. Chamberlain.

2671. MALTA, N. Zur Verbreitung von *Zygodon conoideus* (Dicks.) Hook. et Tayl. [On the distribution of *Zygodon conoideus*.] Latvijas Augstskolas Raksti [Acta Univ. Latviensis] 2: 97-102. 1 pl., 2 fig. 1922.—The author shows that *Zygodon conoideus* is essentially an Atlantic species, its known range extending along the coast from Norway to Spain. He reports new stations for the species in Denmark and East Friesland and confirms the old reports for Schleswig made by T. Jensen and Prahl. In distinguishing *Z. conoideus* from other members of the genus and particularly from the closely related *Z. viridissimus*, he emphasizes the importance of characters derived from the gemmae and illustrates their distinctive features on the accompanying colored plate. At the close of the article a short résumé in Lettish is appended.—A. W. Evans.

2672. MÜLLER, FR. Zur Moosflora der oberen Nahe. [On the moss flora of the upper valley of the Nahe.] Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens 1917/1919: 318-335. 1919.—The author gives a report on the bryophytes of the upper valley of the Nahe, the district studied being in the southwestern part of Germany between the Rhine and the Mosel. After a brief summary of the literature and an account of the geological and physiographic features of the region, he lists 228 true mosses, 13 peat mosses, and 51 hepatics. Except in the case of common and widely distributed species full data regarding stations are given, and these are sometimes supplemented by critical remarks.—A. W. Evans.

2673. NICHOLSON, W. E. Bryological notes from Sicily. Rev. Bryologique 48: 38-43. 1921.—The author gives an account of a bryological excursion to Sicily which he made in the spring of 1914 in company with H. N. Dixon. After describing the botanical features of the places visited, with special reference to the bryophytes, he gives a list of the species collected, numbering 48 mosses and 16 hepatics. The species are accompanied by full data regarding localities and, in several cases, by critical remarks. No new species or combinations are proposed, but *Bryum siculum* Roth is reduced to synonymy under *B. splachnoides* (Harv.) C. M.—A. W. Evans.

2674. NICHOLSON, W. E. *Riccia Crozalsii* Lev. in West Cornwall: a correction. Jour. Botany 56: 360. 1918.—It is shown that a published record for *Riccia Warnstorffii* Limpr. from the Lizard, West Cornwall, England [see Jour. Botany 55: 10. 1917], was based on material of the closely related *R. Crozalsii*, and directions are given for distinguishing the 2 species.—A. W. Evans.

2675. PEARSON, WM. HY. *Pedinophyllum interruptum* (Nees) Lindberg. Jour. Botany 56: 57. 1918.—The author shows that a published record for *Pedinophyllum interruptum* from Ardingly Rocks, Sussex, England, was based on a specimen of *Plagiochila asplenoides*.—A. W. Evans.

2676. PEARSON, WM. HY. *Pedinophyllum pryenaicum* (Spruce) Lindb. Jour. Botany 56: 233-235. 1918.—Although *Pedinophyllum pyrenaicum* is usually regarded as a form or variety of *P. interruptum* (Nees) Lindb., the author emphasizes its distinctive features and suggests that it ought perhaps to be considered a valid species.—A. W. Evans.

2677. SHERRIN, W. R. The lamellae of *Polytrichum*. Jour. Botany 56: 105-107. 22 fig. 1918.—The importance of the leaf-lamellae in distinguishing species of *Polytrichum* is emphasized, and the use of surface-views as well as cross-sections is recommended. On the basis of surface-views the author gives a key to the 4 groups of species represented in the British Isles, extending this key to the individual species in the case of 2 groups. The figures represent the lamellae of the British species.—A. W. Evans.

2678. WHELDON, J. A. Key to the harpidioid *Hypna*. Naturalist 1921: 17-20, 245-248, 343-346. 1921; 1922: 13-16, 103-108. 1922.—The author gives a key for the determination of the polymorphous group of mosses known as the harpidioid *Hypna*, in which he considers not only the species and subspecies represented but also the varieties and forms. He recognizes 28 species in all, divided into the following genera: *Cratoneuron* (1), *Drepanocladus* (12), *Limprichtia* (5), *Sanionia* (3), *Scorpidium* (2), and *Warnstorfia* (5). Although no new species are proposed a number of new subspecies, varieties and forms are indicated, and the treatment adopted necessitates a large number of new combinations. Those of a specific nature are the following: *Cratoneuron glaucum* (Lam.), *Drepanocladus asturicus* (Ren.), *D. Barbeyi* (Ren. & Card.), *D. Flageyi* (Ren.), *Limprichtia latinerve* (Warnst.), *L. pellucida* (Wils.), *Sanionia symmetrica* (Ren. & Card.), *Scorpidium turgescens* (Jens.), *Warnstorfia Rotae* (DeNot.), *W. serrata* (Lindb.), and *W. stenophylla* (Wils.). With rare exceptions these species were originally referred to the genus *Hypnum*.—A. W. Evans.

## MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 2210, 2213, 2222, 2227, 2230, 2241, 2245, 2309, 2459, 2460, 2467, 2564, 2665, 2974, 2975, 3022, 3023, 3062, 3066, 3067, 3080, 3084, 3089, 3104, 3193, 3265, and those in the section Pathology)

### FUNGI

2679. ANONYMOUS. Index to American mycological literature. Mycologia 13: 351-355. 1921.

2680. ANONYMOUS. Index to American mycological literature. Mycologia 14: 53-54. 1922.

2681. ANONYMOUS. Pathological herbarium notes 1. 9 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1920.—In order to furnish to those interested recent and complete information respecting accessions of diseased plants and fungi by the herbarium, notes will be issued at such intervals as the nature of the accessions necessitates. In the first note the fungi exsiccati represented in the herbarium are listed, and the existence of certain other special collections is indicated.—H. M. Fitzpatrick.

2682. ANONYMOUS. Pathological herbarium notes 2. 15 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1921.—A discussion of the term "type" and other related terms as used in the herbarium is given. New exsiccati accessions are listed. A large number of fungi are listed as "noteworthy specimens." These are chiefly new to the herbarium.—H. M. Fitzpatrick.

2683. ANONYMOUS. Pathological herbarium notes 3. 11 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1922.—The number is limited to the consideration of specimens received from the Philippine Bureau of Science.—H. M. Fitzpatrick.

2684. ANONYMOUS. Pathological herbarium notes 4. 13 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1922.—New exsiccati accessions are listed and noteworthy insertions in the herbarium are given. Observations are made on certain specimens.—H. M. Fitzpatrick.

2685. ADAMS, J. F. Observations on the spores of *Schizophyllum commune*. *Torreyia* 21: 98-100. 1 fig. 1921.—Although this fungus is classified with the white-spored agarics, the writer has previously shown [see Bot. Absts. 2, Entry 281] that the spores in mass are pink or salmon-colored. This observation is further supported by prints made on black glazed paper under bell-jars at room temperature. Sporophores collected in January and February in a frozen condition supply the most favorable material, heavy prints being secured in 12-24 hours. Material collected in March is less favorable. Gradual drying provides the condition most favorable for spore-discharge.—J. C. Nelson.

2686. ARTHUR, J. C. Uredinales collected by Fred J. Seaver in Trinidad. *Mycologia* 14: 12-24. 1922.—A list of 71 rusts is given including the following: *Prospodium suppressum* sp. nov. on *Tabebuia* sp., *Puccinia* (?) *ignava* comb. nov. on *Bambos* sp., *P. Seaveriana* sp. nov. on *Oliganthes condensatus*, *P. solanita* (Schw.) comb. nov. on *Solanum* sp., *Aecidium Alibertiae* sp. nov. on *Alibertia* sp., and *A. delicatum* sp. nov. on *Eucharis* sp.—H. R. Rosen.

2687. BATAILLE, F. Note sur deux champignons decrits par M. de Jussieu. [Two fungi described by Jussieu.] *Bull. Trimest. Soc. Mycol. France* 37: 68-69. 1921.—These fungi, described in 1728 in the Mémoires de l'Académie royale des Sciences are identified as follows: the first, "Boleto-Lichen vulgaris" is *Helvella crispa* Fr. (= *H. pallida* Schaef.), the second, "Fungus minor, Allii odore" is *Marasmius prasiosmus* Fr. (= *Ag. alliaceus* Bull.). The original text of these descriptions is given.—D. S. Welch.

2688. BOIS, D. Bois phosphorescents. [Phosphorescent woods.] *Jour. Soc. Nation. Hort. France* 21: 392-395. 1920.—A discussion is given of the causes of phosphorescence and a list of species of fungi which are supposed to be responsible for phosphorescence. Geographical distribution of these species of fungi is given.—H. C. Thomson.

2689. BOSE, S. R. Records of Agaricaceae from Bengal. *Jour. Asiatic Soc. Bengal* 16: 347-353. Pl. 18. 1921.—Descriptive notes are given on 12 species, most of which are figured. No new names appear.—E. D. Merrill.

2690. BOURDOT, H., et A. GALZIN. Hyménomycètes de France (VII. Stereum). [Hymenomyces of France.] *Bull. Trimest. Soc. Mycol. France* 37: 103-112. 1921.—A description and discussion of the genus *Stereum* is given with an analytical key separating 27 species. In addition the following species are described in detail: *S. hirsutum* (Willd.) Pers.; *S. sulphuratum* Berk. et. Rav.; *S. insignitum* Quel.; *S. sanguinolentum* (A. & S.) Fr.; *S. gausapatum* Fr.; *S. rugosum* Pers.; *S. subpileatum* Berk. et Curt.—D. S. Welch.

2691. BREBINAUD, P. Au sujet de quelques champignons d'été. Le Bolet livide est comestible. [A few summer fungi. Boletus lividus is edible.] *Bull. Trimest. Soc. Mycol. France* 37: 53-56. 1921.—The author records an abundant collection of the rare *Boletus lividus* and states that it may be safely eaten. A short account of other edible forms found in summer is given.—D. S. Welch.

2692. CARPENTER, C. W. Morphological studies of the Pythium-like fungi associated with root rot in Hawaii. *Exp. Sta. Hawaiian Sugar Planters' Assoc. Bot. Ser. Bull.* 3: 59-65.

Pl. 16-23. 1921.—The Pythium-like fungus previously reported (Hawaii Agric. Exp. Sta. Press Bull. 54) as an active factor in the root-rot disease of cane (Lahaina disease) is morphologically identical with *Rheosporangium aphanodermatus* Edson and *Pythium Butleri* Subramaniam. The Pythium-like fungus previously reported as associated with the root rot of pineapples (wilt) and rice is similar in its morphology to the cane Pythium. A taro rot fungus previously reported as like Pythium has been found to be a conidium-producing Pythium. The writer considers that the cane fungus manifests a type of diplanetism in the asexual stage allied to that in the conidium-producing Pythiums, and prefers to classify it in the genus *Pythium* rather than in Edson's new genus *Rheosporangium*.—J. M. Westgate.

2693. CHARDON, CARLOS E. A contribution to our knowledge of the Pyrenomycetes of Porto Rico. Mycologia 13: 279-300. Pl. 13-18, fig. 1-4. 1921.—Based on collections made by the writer as well as on collections made by others, some 26 species are described including the following: *Lembosia microspora* sp. nov. on *Ocotea leucoxydon*; *Ophiometria portoricensis* sp. nov. on a log; *Podostroma orbiculare* sp. nov. on a decaying log; *Dothichloe subnodosa* sp. nov. on *Ichnanthus pallens*; *Dothidina peribebuyensis* (Speg.) comb. nov. on species of *Heterotrichum*, *Miconia*, and *Tetrazygia*; *Trabutia Bucidae* sp. nov. on *Bucida buceras*; *Trabutia Guazumae* sp. nov. on *Guazuma ulmifolia*; *Trabutia conica* sp. nov. on *Drepanocarpus lunatus*; *Phyllachora Serjanicola* sp. nov. on *Serjania polyphylla*, and *Phyllachora Whetzelii* sp. nov. on *Eugenia* sp.—H. R. Rosen.

2694. CHENANTAIS, J. E. Notules mycologiques. [Brief mycological notes.] Bull. Trimest. Soc. Mycol. France 37: 61-67. Pl. 9. 1921.—I. Odyssey of a Berlesielle. Attempts to identify a specimen sent to the author by the late abbé Flageolet led to the working out of the problems relating to the genus in question. Following a discussion the author gives the present status of the genus *Berlesielle* as follows: *B. setosa* Wint; *B. setosa* var. *hispidula* Morg.; *B. nigerrima* Blox. = *B. setosa* E. et E. = *B. parasitica* Fab.; *B. nigerrima* var. *hirtella* Bacc. et Av. II. *Gonytrichum caesium* Nees. This form appears to be the conidial stage of *Eriosphæria*.—D. S. Welch.

2695. COUPIN, HENRI. La saveur des champignons. [The flavor of mushrooms.] La Nature 1922: 139. 1922.—More general reference to taste of the flesh of mushrooms in descriptive work is advocated.—H. M. Fitzpatrick.

2696. CUNNINGHAM, G. H. A note recording the presence in New Zealand of the perithecial stages of apple and pear black spot. New Zealand Jour. Agric. 23: 219-221. 1 fig. 1921.—Leaves showing perithecia have been secured from various districts. The perithecia develop best on leaves lying in sheltered places. The method of spore discharge is receiving detailed study. A paper dealing with life-history details will be published later.—N. J. Giddings.

2697. DAVIS, J. J. [Note under "Notes and Brief Articles."] Mycologia 14: 46. 1922.—Infection experiments indicate that *Pucciniastrum arcticum* (Lagh.) Tranz. and *P. americanum* (Farl.) Arth. are distinct.—H. R. Rosen.

2698. DURAND, ELIAS J. The genus *Catinella*. Bull. Torrey Bot. Club 49: 15-21. 1922.—A characterization of the genus is given and the following new combinations are published: *Catinella nigro-olivacea* (Schw.) Durand and *C. elastica* (Pat. & Gail.) Durand.—P. A. Muns.

2699. FINK, BRUCE. An addition to the distribution of a rare fungus. Mycologia 14: 49-50. 1922.—*Tylostoma verrucosum* is reported from the vicinity of Oxford, Ohio.—H. R. Rosen.

2700. FINK, BRUCE, and SYLVIA C. FUSON. An arrangement of the Ascomycetes of Indiana. Proc. Indiana Acad. Sci. 1919: 113-133. 1921.—The authors present a classification of all the ascomycetes previously published for the state of Indiana. The list comprises 372 species from 38 counties.—F. C. Anderson.

2701. FITZPATRICK, H. M., H. E. THOMAS, and R. S. KIRBY. The *Ophiobolus* causing take-all of wheat. *Mycologia* 14: 30-37. Pl. 10., fig. 1. 1922.—Material of the take-all fungus collected in New York compared with material from England, France, Italy, and Japan shows the fungus to be everywhere the same. McAlpine finds the American fungus agrees with the Australian. The authors conclude that Saccardo's description of *Ophiobolus graminis* and Berlese's figures made from the type collection indicate that the American fungus is this species. Berlese's conclusion that *O. graminis* is the same as *Sphaeria eucrypta* and *S. cariceti* is called to attention. Comparison of the take-all fungus with the type and other materials of *S. cariceti* lead to the conclusion that the 2 are the same, and the name *Ophiobolus cariceti* is accepted for the species. A technical description of the fungus is given. Berlese's statement that *Sphaeria eucrypta* and *S. cariceti* are identical is not sustained. The species *Ophiobolus herpotrichus* is shown to differ strikingly from *O. cariceti* in possessing brown spores twice as long as those of the take-all organism.—H. R. Rosen.

2702. GRAFF, PAUL W. Philippine Basidiomycetes. IV. Bull. Torrey Bot. Club 48: 283-286. 1921.—Distributional notes are given for many species. The following new combinations are published: *Ganoderma leplopum* (Pers.), *G. tornatum* var. *subtornatum* (Murr.), *Fomes Merrittii* (Murr.), *Polystictus caperatus* (Berk.), *P. Elmerianus* (Murr.), *P. nigromarginatus* (Schwein.), and *P. Ramosii* (Murr.).—P. A. Munz.

2703. GROVE, W. B. Mycological notes. VI. Jour. Botany 59: 311-315. 1921.—*Uredo murariae* P. Magn. is transferred to *Milesina*, becoming *M. murariae* (Magn.) Grove; and *Hyalospora Feurichii* Fischer becomes *Milesina Feurichii* (Fischer) Grove. A new genus, *Placophomopsis* Grove, based on *P. Heveae* sp. nov., a dangerous parasite in Uganda, is described.—Adele Lewis Grant.

2704. GROVE, W. B. New and noteworthy fungi. VII. Jour. Botany 60: 14-17, 42-49. 1922.—The author continues his critical discussion of various fungi growing in Great Britain. The following species are described as new: *Phyllosticta Asperulae*, *P. Heucherae*, *Placosphaeria Ulmi*, *Phomopsis Garryae*, *P. Hyperici*, *P. minuscula*, *P. Oleariae*, and *Cytospora Hyperici*. *Phyllosticta anceps* f. *nozirosa* is described as a new form and *P. Sonchi* Sacc. is transferred to the genus *Ascochyta* as *A. Sonchi*.—Adele Lewis Grant.

2705. GROVE, W. B. New and noteworthy fungi. VIII. Jour. Botany 60: 81-86. 1922.—This part of the series deals only with species occurring in Great Britain. *Amphorula*, based on a single species, *A. sachalinensis*, is described as a new genus. In addition, the following species, varieties, and forms are described for the first time: *Hendersonia vagans* var. *corni*, *Septoria polaris* var. *scotica*, *S. Polypodii*, and *Camarosporium Pini* f. *conorum*. *Phlyctaena Jasiones* Bres. is transferred to *Septoria* as *S. Jasiones*, and *Lophodermium melaleucum* DeNot. becomes *Leptothyrium melaleucum*.—Adele Lewis Grant.

2706. GUILLERMOND, A., et PEJU. Une nouvelle espèce de levure du genre *Debaryomyces*. [A new species of yeast of the genus *Debaromyces*.] Bull. Trimest. Soc. Mycol. France 37: 35-38. Fig. 1-2. 1921.—The new species *Debaryomyces Nadsonii* is described. Cultural characters, morphology, temperature relations, sexual reproduction, and affinities are given.—D. S. Welch.

2707. GWYNNE-VAUGHAN, DAME HELEN. Fungi: Ascomycetes, Ustilaginales, Uredinales. Roy. 8 vo., xi + 232 p. University Press: Cambridge, 1922.

2708. HAENSELER, C. M. Fungi injurious to paints. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 605-607. 1920.—This paper treats of the effects of fungi on painted surfaces, both with reference to discolorations and injuries. These troubles are especially noticeable in greenhouses. The most important organisms listed are *Dematium pullulans* and species of *Alternaria*, *Aspergillus*, *Penicillium*, *Sporotrichum*, *Cladosporium*, and *Phoma*. The writer



discusses the effects of the fungi on different kinds of paints in greenhouse tests and gives a preliminary discussion of laboratory experiments.—*Mel. T. Cook.*

2709. HODGES, R. S. **Ringworm of the nails.** Arch. Derm. and Syph. 4: 1-28. Fig. 1-12. 1921.—Sixteen cases of ringworm of the nails are described in this report. A fungus has been found present in every case. The prevalence of the disease in the South [U. S. A.] indicates the ratio of 1 case to each 500 of population, a prevalence 10 times greater than reported among foreign immigrants at Ellis Island. The invasion of the nail seemed to be secondary to an eruption on the hands and feet and dependent on some slight injury. Twelve cultures of fungi were obtained from 13 cases. These fungi could be separated into 3 cultural varieties; 1 variety proved to be a small-spored ectothrix, *Trichophyton (Oospora)*, whereas the 2 other cultural varieties representing 1 species were probably identical with *Trichophyton (Oospora) rubrum* (Bang) Castellani, which is recorded for the 1st time as attacking the nails.—*W. H. Emig.*

2710. HORI, S. **Chinese parasitic fungi collected by Ching Yiu Keo.** Ann. Phytopath. Soc. Japan 14: 66. 1921. [Text in Japanese.]—A list of parasitic fungi collected in China by Ching Yiu Keo in August, 1920, as follows: *Cercospora Punicae* P. Henn. on *Punica Granatum*, *Cercosporina Ipomoeae* (Wint.) Hori on *Pharbitis hederacea*, *C. Nelumbii* Hori on *Nelumbium speciosum*, *Cladosporium Paeoniae* Pass. on *Paeonia Moutan* and *P. albiflora*, *Peronosplasma para cubensis* (B. et C.) Clinton on *Cucurbita Pepo*, *Peronospora Trifoliorum* DeBy. on *Glycine Soja*, *Pestalozzia Diospyri* Syd. on *Diospyros Kaki*, *P. Puttemansii* P. Henn. on *Thea Sasangua*, *Piricularia grisea* (Cke.) Sacc. on *Panicum sanguinale*, *P. Oryzae* Brios. et. Cav. on *Oryza sativa*, *Ascochyta hortorum* (Speg.) C. O. Smith on *Solanum Melogena*, *Pseudomonas Melvacearum* E. Sm. on *Gossypium herbaceum*, *Cercospora Hostae* Hori sp. nov. (no description given) on *Hosta Sieboldiana*, *Uromyces appendiculatus* (Pers.) Link. and *Cercospora Vignae* Racib. on *Vigna Catjang*, *Helminthosporium turcicum* Pass. on *Zea Mays*, *Phyllosticta sepaeicola* Mass. on *Glycine Soja*.—*Takewo Hemmi.*

2711. JACKSON, H. S. **The Uredinales of Indiana. III.** Proc. Indiana Acad. Sci. 1920: 165-182. 1921.—The article contains a list of unrecorded hosts, corrections for species published in former papers, and descriptions of 12 species new to the state. A host index for the 3 papers is also given. [See also Bot. Absts. 1, Entry 781.]—*F. C. Anderson.*

2712. JACKSON, H. S. **The Ustilaginales of Indiana. II.** Proc. Indiana Acad. Sci. 1920: 157-164. Fig. 1. 1921.—This supplement to an earlier article [see Bot. Absts. 1, Entry 780], in which 47 species on as many hosts are recorded for the state, gives additional hosts for the above species and a few corrections; also descriptions of 10 species new to the state. Indices to species and hosts for both papers are included.—*F. C. Anderson.*

2713. KEILIN, D. **On a new Saccharomycete Monosporaella unicuspidata gen. n. nom. n. sp., parasitic in the body cavity of a dipterous larva (Dasyhelea obscura Winnertz).** Parasitology 12: 83-91. Fig. 1-3. 1920.—The genus *Monospora* (= *Monosporaella*) was founded by Metchnikoff in 1884 to designate a parasitic fungus, *M. bicuspidata*, which he discovered in the body cavity of *Daphnia magna*, where it multiplies actively by budding in a yeast-like manner. Metchnikoff's studies on this parasite afford a striking instance of the phenomenon of phagocytosis. The genus *Monosporaella* has comprised Metchnikoff's *M. bicuspidata* and Butchli's yeast-like fungus, the latter not sufficiently described and illustrated to determine more than its generic position. In the summer of 1919 the author found a new species of *Monosporaella* to which he gives the name *M. unicuspidata*. The author cites the occurrence of the new fungus, states that "it appears probable that a number of larvae may rid themselves of parasites by phagocytosis," and supports this supposition by certain observations. The fat body seems to be the only organ which is completely destroyed by the parasite. The resistant forms of the latter are set free on decomposition of the larva. A description of the new species of *Monosporaella* is given followed by a general discussion of the systematic position of the genus. A

brief reference is made to Peglion's and Hansen's views on classification of Saccharomycetes, the author disagreeing with the latter's view that the 2 genera *Monosporella* and *Nematospora* are "doubtful Saccharomycetes." The Hansen classification, with the few modifications and details added by Lafar, is given, with some details bearing on the genus *Monosporella*. In an appendix reasons are given for changing *Monospora* to *Monosporella*.—C. D. Sherbakoff.

2714. KEISSLER, KARL VON. *Pilze aus Salzburg*. [Fungi from Salzburg.] Beih. Bot. Centralbl. II. 38: 410-430. 1921.—Descriptions are given of new or rare species collected by the author in Salzburg and now in the State Museum at Vienna. The following new species or new combinations are given: *Belonopsis graminea* (*Mollisia graminea* Karst.), *B. pallens* (*Belonium pallens* Sacc.), *Geopyxis Catinus* Sacc. var. *microspora*, *Hendersonia stagonosporoides* Tassi var. *Dianthi* (Bub.) Keissl., *Humaria subhirsuta* var. *rubra* (Rehm) Keissl., *H. subhirsuta* var. *theleboloides* (Alb. et Schw. apud Fr.) Keissl., *Melanconium sphaerioidum* Lk. f. *apioearpon* (Lk.) Keissl. et f. *didymoideum* (Vest.) Keissl., *Septoria Orchidearum* West. var. *Listerae*, *Stagonospora completa* (Sacc.) Keissl.—The following were found to be synonyms: *Coniothyrium Dumeae* Bri. et Cav. (*C. rhamnigenum* Bub.), *Cordyceps Dittmarii* Quel. (*C. specophila* B. et C.), *Fusarium salicicolum* All. (*F. Salicis* Fuck.), *Gnomonia spermogonioides* Rehm (*G. Rubi* Wint.), *Lachnum flavo-fuligineum* (A. et S.) Rehm (*L. leucophneum* Karst.), *Lachnea gilva* (Boud.) Sacc. (*L. fimbriata* Sacc.), *Peronospora Knautiae* Fuck. and *P. violacea* Berk. (*P. Dipsacii* Tul.), *Peziza albo-furfuracea* Saut. (*Lachnum clandestinum* Karst.), *Peziza gilva* Boud. (*Lachnum fimbriata*), *Phyllosticta Caraganeae* Syd. (*P. Spaethiana* All. et Syd.), *P. Rhamni* West. (*Coniothyrium rhamnigenum* Bub.), *Ramularia hamburgensis* Lindau (*R. filaris* var. *Hieracii* Bauml.), *Septoria Senecionis-silvatici* Syd. (*S. Senecionis* West.).—L. Pace.

2715. KRIEGER, LOUIS C. C. *Schizophyllum commune* with a stipe. *Mycologia* 14: 47-48. 1922.—The fungus, growing from shells of buried chestnuts, produced stipes "just long enough to permit of the formation of the sporophore in the light."—H. R. Rosen.

2716. LENDNER, A. A propos de l'heterothallisme des Coprins. [Concerning heterothallism in Coprinus.] *Bull. Soc. Bot. Genève* 12: 140-141. 1920.

2717. LENDNER, A. A propos de l'heterothallisme des Coprins. [Concerning heterothallism in Coprinus.] *Bull. Soc. Bot. Genève* 12: 337-352. Fig. 1-9. 1920.—By means of pure cultures obtained from single spores, *Coprinus clavatus* Fries is shown to be heterothallic whereas *Coprinus sterquilinus* Fries is homothallic. Individual differences in separate strains were detected.—W. H. Emig.

2718. LIESKE, RUDOLF. *Morphologie und Biologie der Strahlenpilze (Actinomyceten)*. + 292 p., 4 pl., 112 fig. Gebrüder Borntraeger: Berlin, 1921.

2719. MAINS, E. B. The heteroecism of *Puccinia montanensis*, *P. Koeleriae*, and *P. apocrypta*. *Mycologia* 13: 315-322. Fig. 1-4. 1921.—By sowing telial material of *Puccinia montanensis* on Boraginaceous and Hydrophyllaceous species no infections were obtained. Since field evidence indicated a possible relationship between a rust on the grasses *Agropyron tenerum*, *A. Smithii*, and *Hordeum jubatum* and aecia on *Berberis Fendleri*, sowings of aeciospores from the latter host, collected in Colorado, were made on *Hordeum jubatum* and *Hystrix latriz* with infections resulting. Likewise, telia on *Agropyron tenerum*, *A. Smithii*, and *A. P.* gave infections on *Berberis Fendleri*. It is therefore concluded that the alternate host of *Puccinia montanensis*, a species with broad, thick-walled teliospores and numerous paraphyses and the uredinia, is *Berberis Fendleri*. A morphological study indicates that this rust is distinct from *Puccinia Koeleriae*, which also has aecia on Garberry. The *Hydrophyllum* aecia which Arthur had previously connected with a rust on *Agropyron tenerum* and *Elymus virginicus* are now considered to belong to *Puccinia apocrypta* instead of *P. montanensis*, *P. apocrypta* having rediniospores and teliospores which are markedly different from those of *P. montanensis*.—R. Rosen.

2720. MAINS, E. B. Unusual rusts on *Nyssa* and *Urticastrum*. Amer. Jour. Bot. 8: 442-451. 6 fig. 1921.—A new genus of rusts, *Aplospora*, belonging to the family Melampsoraceae; and 2 new species, *Aplospora Nyssae* and *Cerothelium Dicentrae*, are here described. The position and relationships of the 2 genera are discussed, considerable prominence being given to the early maturity and germination of teliospores shown by both.—E. W. Sinnott.

2721. MARTIN, CHARLES ED. Adjonction à la florule mycologique Genevoise. [An addition to the mycological flora of Switzerland.] Bull. Soc. Bot. Genève 12: 136. 1920.—*Humaria euchroa* Karsten known from Finland and France is reported for the first time from Switzerland.—W. H. Emig.

2722. MELIN, ELIAS. On the mycorrhizas of *Pinus silvestris* L. and *Picea abies* Karst. A preliminary note. Jour. Ecol. 9: 254-257. 1922.—The mycorrhizas of *Pinus silvestris* and *Picea abies* cause a limited development of rootlets. In the former the dichotomous branching is often modified by the development of nodules as large as peas composed of many densely crowded short branches. Three mycorrhizal fungi have been isolated by the author from the 2 species. They have been called preliminarily *Mycelium radialis silvestris* and *M. radialis abietis*. They are aerobic organisms growing more vigorously in an acid substratum, are exceedingly specialized, and develop slowly. No fixation of nitrogen takes place in pure cultures although there is evidence that the mycorrhizas of *Pinus silvestris* fix free nitrogen. Seeds of both trees germinate without the fungi and the fungi are not disseminated by the seed. The fungi from pure cultures infect sterile seedlings through root hairs and then develop more vigorously. At first the hyphae grow principally in the interior of cortical cells where they form a pseudoparenchyma of the same appearance as in the fungus mantle of the completely developed mycorrhiza. Later the "Hartig tissue" and the fungus mantle are formed.—Geo. D. Fuller.

2723. MURRILL, W. A. A fragrant polypore. Mycologia 14: 46-47. 1922.—*Trametes suaveolens* occurring on poplar (*Populus grandidentata*) as well on willows is reported.—H. R. Rosen.

2724. MURRILL, W. A. *Hygrophorus caprinus*. Mycologia 14: 48-49. 1922.—A collection from Massachusetts is reported and described.—H. R. Rosen.

2725. MURRILL, W. A. Illustrations of fungi-XXXIII. Mycologia 14: 25-29. Pl. 2-8. 1922.—The following fungi are described and illustrated: *Chanterel floccosus* Schw., *Clitocybe phyllophila* (Pers.) Quél., *C. subhirta* Peck, *Melanoleuca Thompsoniana* Murrill, *M. edurisiformis* Murrill, *Galerula Hypni* (Batsch) Murrill, *Gymnopilus flavidellus* Murrill, and *Hebeloma luteum* Murrill.—H. R. Rosen.

2726. NEGRI, G. Ricerche sulla biologia di un *Penicillo* patogeno (*Penicillium mycetomagenum* Mant. et Ngr.). [Researches on the biology of a pathogenic *Penicillium*.] Atti R. Accad. Sci. Torino 56: 67-78. 1920.—A study is reported of a black granular mycetoma apparently corresponding with Madura foot observed in a clinic. Granules were removed from the tissues of an amputated foot and placed on glycerine agar and Sabouraud medium; a *Penicillium* developed. The cultural characteristics of the organism are given in considerable detail.—Harriet M. Libby.

2727. NIENBURG, W. Pilze und Flechten. [Fungi and Lichens.] 8 vo., 128 p. B. G. Teubner: Leipzig and Berlin, 1921.

2728. OVEREEM, C. VAN. Mykologische Mitteilungen. Serie I. Ascomyceten. Drittes Stück. Über zwei interessante Discomyceten. [Mycological notes. Series I. Ascomycetes. Third part. Concerning two interesting discomycetes.] Hedwigia 63: 50-57. 1921.—*Discina venosa* (Pers.) Sacc. is considered with respect to European distribution, time of

appearance, and anatomical structure. The subspecies *reticulata* (Grev.) Rehm is regarded as only a better-developed form, reaching a diameter of from several cm. to 1.5 dm. The folding of the hymenium is slight in small specimens, but becomes pronounced in large ones, where it may finally resemble the reticulations of *Morchella*. The color of the hymenium is at first dark ochre-yellow, changing later to a chestnut-brown, or finally to black-brown. The lightest color is seen in parts where the folding is most pronounced. In younger specimens, the stipe is only 1 cm. long, somewhat less in diameter, and largely hypogean, so that the apothecium appears to be sessile. As the hymenium folds, the stipe elongates and becomes *Helvella*-like, reaching 3 cm. in length and 2 cm. in diameter. Various stages of development have been regarded as distinct subspecies or even as species by some workers. As in the *Morchellaceae*, several protoplasmic granules sometimes occur outside the wall at one pole of the spore or at both poles, and these have been overlooked by several workers. The origin of these bodies is unknown, but they appear to be absent in species in which there are oil drops in the spores. The author concludes that the *Discineae*, including *Discina* and *Disciotis*, with the *Morchellaceae* constitute the *Morchellaceae*. *Discina venosa* is edible and is often found in the markets of Europe.—*Sarcosphaera coronaria* (Jacq.) Boud. is seen infrequently, but is distributed over middle Europe. The size and color of the apothecium, the color of the hymenium, the size and form of asci and spores are considered. Sizes of asci and spores are presented in tabular form from 9 authorities, and, excluding extremes, a conclusion is reached regarding the size of each. The validity of the subspecies *macrocalyx* (Riess) and the relationships of the species are considered.—*Bruce Pink*.

2729. OVERHOLTS, L. O. Diagnoses of American *Porias*-I. *Mycologia* 14: 1-11. *Pl. 1*, fig. 1-6. 1922.—*Poria ambigua* Bres., *P. ferruginosa* (Schr.) Fr., and *P. nigrescens* Bres. are thoroughly described.—*H. R. Rosen*.

2730. PARKS, HAROLD E. California hypogaeous fungi—*Tuberaceae*. *Mycologia* 13: 301-314. 1921.—An account is given as to where and how hypogaeous fungi are collected in California, together with descriptive notes of 16 species in various genera.—*H. R. Rosen*.

2731. PATOUILLARD, N. *Clathrotrichum*, nouveau genre d'hyphomycètes. [*Clathrotrichum*, a new genus of *Hyphomycetes*.] *Bull. Trimest. Soc. Mycol. France* 37: 33-35. 4 fig. 1921.—A new genus, *Clathrotrichum*, with a single species, *C. subcarneum*, is established in the group *Hyalostilbaceae*. The diagnosis is given from a specimen collected on *Setaria* in Ecuador by Lagerheim.—*D. S. Welch*.

2732. PATOUILLARD, N. Une nouvelle *Lepiote* du Bresil (*Lepiota Puttemansii*). [A new *Lepiota*, *Lepiota Puttemansii*, from Brazil.] *Bull. Trimest. Soc. Mycol. France* 37: 81-83. 1921.

2733. PETRAK, F. *Mycologische Beiträge. I.* [Mycological contributions. I.] *Hedwigia* 62: 282-319. 1921.—This contribution is given in part to a consideration of the following new genera: *Khekia*, a monotypic genus of the *Lophiostomataceae* resting on the type species *K. ambigua* (Pass.) Petr., a parasite on species of *Diatrypella*. *Allantoporthe*, a valloid genus, segregated from *Diaporthe*; the genus is based on the single species *A. tessella* (Pers.) Petr. *Discodilaporthes* is also segregated from *Diaporthe* and contains the 2 species *D. sulphurea* (Puck.) Petr. and *D. xanthostoma* (Mont.) Petr. *Botryosphaerostroma* is another monotypic genus, erected for *B. quercina* (Sacc.) Petr. and closely related to *Botryodiplodia* of the *Phomataceae*. *Diploplacosphaeria* likewise contains but a single species, *D. ruthenica* Petr., which is closely related to *Thoracella* and *Placosphaerella* of the *Phomataceae*. *Gloeosporidiella* is another monotypic genus, the type species of which, *G. ribis* (Lib.) Petr. seems to be related to *Colletotrichella* of the *Melanconiaceae*.—New species, other than the above, are: *Diatrypella moravica* Petr. & Keissl., *Tapesia moravica*, *Phoma evonymicola*, *Stagonospora calacumatis*, and *Sphaeropsis hranicensis*.—The remainder of the paper contains critical notes on the following species of ascomycetes and imperfect fungi: *Trichosphaeria nitidula* (Sacc.)

Petr., *Cucurbitaria moravica* Rehm, *Sphaerella septorispora* Sacc., *Diaporthe valsiformis* Rehm, *Valsella Crataegi* Allesch., *Cenangium clandestinum majus* Rehm, *Pezizella culmigena* Sacc., *Lachnella fuscocinnabarinum* Rehm, *Phyllosticta asperulae* Sacc. & Fautr., *Phomopsis elastica* Petr., *Cytospora Petrakii* H. Zimm., *Fusicoccum cornicolum* Sacc., *F. corylinum* Sacc., *F. Ellisti* Petr. & Died., *F. ericeti* Sacc., *F. moravicum* Bub., *F. pulvinatum* Sacc., *Diplodia Kabatiana* Bub., *Septoria asari* Sacc., *Coniothyrium incrustans* Sacc., *Septomyza picea* Sacc., *Sporonema quercicolum* C. Mass., *Cryptosporiopsis nigra* Bub. & Kab., *Gloeosporium ribis* (Lib.) Mont. & Desm., and *Didymosporium Petrakeanum* Sacc.—Bruce Fink.

2734. PEYRONEL, BENIAMINO. Sur l'identité du *Spirospora Castaneae* Mangin et Vincens et du *Stephanoma italicum* Sacc. et Trav. avec l'*Acrospira mirabilis* B. et Br. [Concerning the identity of *Spirospora Castaneae*.] Bull. Trimest. Soc. Mycol. France 37: 56-61. 1921.—These 3 forms are shown to be identical, *Acrospira mirabilis* B. et Br. having priority. A synonymy is given.—D. S. Welch.

2735. POTRON. Morilles sur le champ de bataille. [Morels on the battle field.] Bull. Trimest. Soc. Mycol. France 37: 75-77. 1921.—Morels have been found in unusual abundance on denuded battle fields and among ruins in devastated areas.—D. S. Welch.

2736. REINKING, O. A. Higher Basidiomycetes from the Philippines, and their hosts, V. Philippine Jour. Sci. 19: 91-114. 1921.—The author enumerates about 110 species, the hosts being indicated for nearly all collections cited.—E. D. Merrill.

2737. RODWAY, L. Additions to the fungus flora of Tasmania. Part 3. Papers and Proc. Roy. Soc. Tasmania 1920: 153-159. 1921.

2738. SCHENK, ERNA. Die Fruchtkörperbildung bei einigen *Bolbitius*- u. *Coprinus*-arten. 8 vo., 64 p., 12 fig. Diss. Heidelberg, 1919.

2739. SHEAR, C. L. Review of Klebahn on life histories of Ascomycetes. [Rev. of: KLEBAHN, H. Haupt- und Nebenfruchtformen der Askomyzeten. Erster Teil, Eigene Untersuchungen. 8 vo., 395 p., 275 fig. Gebrüder Borntraeger: Leipzig, 1918.] Mycologia 13: 346-350. 1921.—"This work will be of great value to all mycologists and pathologists, as the various papers which have been published on life history studies are much scattered \* \* \*." As to Klebahn's plan of dividing the genus *Mycosphaerella* according to the spore types of the imperfect fungi which have been found to be connected with the ascogenous form, as *Septorisphaerella* with *Septoria* as the imperfect stage, *Ramularisphaerella* with *Ramularia* as the imperfect stage, etc., the reviewer concludes "there is much more to be said against the plan than for it."—H. R. Rosen.

2740. SIEGLER, E. A., and A. E. JENKINS. A new *Sclerotinia* on mulberry. Science 55: 353-354. 1922.—This new species, on fruits of cultivated *Morus alba*, is described and named *Sclerotinia carunculoides*.—C. J. Lyon.

2741. TANAKA, TŌZABURŌ. New Japanese fungi—notes and translations-X. Mycologia 13: 323-328. 1921.—The following fungi occurring on *Thea sinensis*, originally described in Japanese, are redescribed: *Hypodermopsis Theae* K. Hara parasitic on trunks and branches, *Stagonospora Theae* K. Hara saprophytic on trunks, *Leptosphaeria Hottai* K. Hara parasitic on trunks, *Sillia Theae* K. Hara parasitic on trunks and branches, *Ascochyta Theae* K. Hara parasitic on leaves, *Valsa Theae* K. Hara parasitic on weakened trunk, *Diatrype Theae* K. Hara saprophytic on trunks, and *Hendersonia Theae* K. Hara parasitic on leaves.—H. R. Rosen.

2742. THOM, C. [Rev. of: GUILLIERMOND, A. The yeasts. (Les levures.) Translated by: TANNER, FRED WILBUR. John Wiley and Sons: New York, 1920.] Absts. Bact. 5: 376. 1921.—This translation (of the 12th edition) follows the original very closely, "too literally in

many cases" except in the chapters on physiology where it becomes a revision.—D. Reddick.

2743. TORREY, GEORGE SAFFORD. *Coronella nivea* Crouan. Bull. Trimest. Soc. Mycol. France 37: 88-93. Pl. 10. 1921.—Cultural characters, morphology, parasitism, and affinities of the species are discussed; a synonymy and short bibliography are appended.—D. S. Welch.

2744. TORREY, GEORGE SAFFORD. Les conidies de *Cunninghamella echinulata* Thaxter. [The conidia of *Cunninghamella echinulata* Thaxter.] Bull. Trimest. Soc. Mycol. France 37: 93-98. Pl. 10. 1921.—A cytological study shows that the so-called conidia of *C. echinulata* are produced in a manner similar to the conidia of the Hyphomycetes. A double membrane was not observed in any of the spores. In spite of these facts it seems possible to arrange a series of genera in the Mucorales which shows how this conidium might have been developed from a sporangium. It is not necessary to suppose that the conidia of the Hyphomycetes have had the same origin.—D. S. Welch.

2745. VINCENS, F. Valeur taxinomique du sillon germinatif des ascospores chez les Pyrenomycètes. [Taxonomic value of the germinal ridge of the ascospores in pyrenomycetes.] Bull. Trimest. Soc. Mycol. France 37: 29-33. 1921.—A previous publication by the author has been sharply criticized by Chenantais. This criticism contains no suggestions of a constructive nature. That changes in the present systematic arrangement of genera would be caused by the adoption of the suggested criterion is not a good argument for its rejection. Chenantais fails to quote authorities. He has himself said that the spore and its characters are the best index of relationship. The author proposes to maintain his former statements until shown that they are untenable.—D. S. Welch.

2746. WELLES, C. G. *Cercospora* leaf spot of *Averrhoa carambola*. Philippine Jour. Sci. 19: 447-451. Pl. 1-2. 1921.—*Cercospora Averrhoi*, described as a new species, causes a serious disease of *Averrhoa carambola*. Control methods are indicated.—E. D. Merrill.

2747. WILL, H. Einige Mitteilungen über die Beeinflussung des Sporenbildungsvermögens durch das Auftragen der Hefe auf den trockenen Gipsblock. [Notes on influence on the spore-forming property of yeasts when transferred to dry gypsum blocks.] Centralbl. Bakt. II Abt. 53: 471-480. 1920.—In parallel experiments, yeast cells were transferred to dry and moistened gypsum blocks. In 9 tests an appreciably higher percentage of spores was obtained on the moistened blocks.—Anthony Berg.

#### LICHENS

2748. C., A. H. [Rev. of: SMITH, ANNIE LORRAIN. Lichens. xxviii + 464 p., 135 fig. University Press: Cambridge, 1921.] Jour. Botany 59: 331-333. 1921.

2749. D., O. V. Lichens. [Rev. of: (1) SMITH, ANNIE LORRAIN. Lichens. xxviii + 464 p., 135 fig. University Press: Cambridge, 1921. (2) SMITH, ANNIE LORRAIN. A handbook of the British lichens. vii + 158 p. British Museum: London, 1921.] Nature 109: 5-6. 1922.—The first is considered not well illustrated as a whole. The figure on p. 117 appears to be *Cladonia uncialis* instead of *C. furcata*. More reference to *exsiccata* are considered desirable. The fact that most lichens will not grow in polluted city air is regarded as perhaps a reason for the common lack of interest in them.—The second is only a key to the first.—O. A. Stevens.

2750. LEDSAIN, BOULY DE. Lichenes prope Habanam in insula Cuba anno 1914 a cl. fratre Arsène Brouard lecti. [Lichens collected near Havana, Cuba, by Father Brouard in 1914.] Bryologist 24: 68-69. 1921.—The list enumerates, with habitats, 28 species and varieties. *Endopgyrenium Brouardi* and *Tomasellia Brouardi* are proposed as new species, with new varieties in *Caloplaca*, *Opegrapha*, and *Gyrostomum*, and new combinations in *Placodium*, *Toninia*, and *Bacidia*.—E. B. Chamberlain.

2751. MELLOR, ETHEL. Les lichens vitricoles et leur action mécanique sur les vitraux d'église. [On glass-attacking lichens and their mechanical action on church windows.] Compt. Rend. Acad. Sci. Paris 173: 1106-1108. 1921.—A list of 22 species of lichens found growing on church windows is given. It is found that such windows become scaly and may become partly opaque and give the spectral colors. Corrosion of the glass may take place to a depth of 5 mm. and is believed to be due to the CO<sub>2</sub> given off in the respiration of the fungus. It is also aided by water and the mechanical action of the lichen upon the glass.—C. H. Farr.

2752. STRATO, CL. Über Wachstum und Regeneration des Thallus von *Peltigera canina*. [Concerning growth and regeneration of the thallus of *Peltigera canina*.] Hedwigia 63: 11-42. Fig. 1-13. 1921.—The work was begun by Strato in 1913 and continued at intervals until he fell in battle in 1917, when F. TOBLER undertook to bring the results together and finish the research. The plants were in part observed in their natural habitats, and others were observed in transplanted cultures, where control could be secured with respect to substrata and other conditions of environment. The sectioning was done freehand for the most part, and stains and other chemicals were used to secure desired results. The growth of the thallus was found to be marginal. The origin and development of the marginal undulations are not distinctly different from those of the isidia, except as to position, the latter appearing on the dorsal surface. Through injury isidia are often produced in large numbers; the algal-host cells may appear at the surface, while the lichen hyphae grow upward around them and thus form the isidia. The frequent appearance of isidia in rows is related to their development along rifts in the thallus; the isidia sometimes function in vegetative reproduction. Small portions of the thallus also often function in regeneration, which proceeds mainly from the hyphae of the medullary layer below the cortical plectenchyma, the algal-host cells being thus carried into the regenerated thallus. The part of plectenchyma in regeneration is small. The results are against the view that the algal-host cells originate from the hyphae and are, therefore, a part of the lichen as was advanced by Minks and later confirmed by Elfving.—Bruce Fink.

2753. ZAHLBRUCKNER, A. Catalogus lichenum universalis. Vol. I, part 2. iv + 320 p. Gebrüder Borntraeger: Berlin, 1921.

#### BACTERIA

2754. ALBERT, HENRY. A classification of diphtheria bacilli based on the toluidin blue-iodine method of staining. [Abstract.] Absts. Bact. 5: 25. 1921.

2755. ALBERT, HENRY. Variations in the morphology of the diphtheria bacillus due to age. [Abstract.] Absts. Bact. 5: 14-15. 1921.—Marked differences in size, shape, and granulation are noted for 125 cultures.—D. Reddick.

2756. AYERS, S. H., and P. RUPP. Differentiation of hemolytic streptococci from human and bovine sources by the hydrolysis of sodium hippurate. Jour. Infect. Diseases 30: 388-399. 1922.—The beta hemolytic types of streptococci can be separated into those of the bovine udder, which hydrolyze hippuric acid into benzoic acid and glycocholic acid, and those of human origin, which do not.—Selman A. Waksman.

2757. BAKER, H. R. Substitution of brom-thymol-blue for litmus in carbohydrate media. [Abstract.] Absts. Bact. 6: 3. 1921.—The advantages of brom-thymol-blue (1:41,666) over litmus for quantitative determination of acid or alkali production by bacteria are described.—D. Reddick.

2758. BAYNE-JONES, S., and PAULINE ZINNINGER. The decomposition of tryptophane by staphylococci without the production of indol. [Abstract.] Absts. Bact. 5: 3. 1921.—One hundred fifteen strains of staphylococci were tested on numerous media. "The medium in which tryptophane was the only source of nitrogen served for the growth of staphylococci

but was not decomposed to indol." It is concluded that indol is not produced by staphylococci.—*D. Reddick*.

2759. BEAUDETTE, F. R., and L. D. BUSHNELL. A study of an organism isolated from the unabsorbed yolks of chicks dead in the shell. [Abstract.] *Absts. Bact.* 6: 19-20. 1922.—The organism, which is pathogenic, is described in some detail. It is near *Bacillus pullorum* in its reactions.—*D. Reddick*.

2760. BEHRENS, CHARLES A. The cultivation of *Spirochaeta Novyi* without the use of tissue from animal organs. *Proc. Indiana Acad. Sci.* 1919: 225-228. 1921.—A culture of *Spirochaeta Novyi* has been perpetuated for 6 generations upon ascitic fluid containing unfibrinated normal blood. The cultural type differs from the normal blood type in its morphology and its staining properties.—*P. C. Anderson*.

2761. BERGEY, D. H. A simple substitute for the Hiss serum-water medium. *Absts. Bact.* 6: 5. 1922.—The substitute consists of a 1 per cent solution of casein in ordinary peptone solution. It may be sterilized in the autoclav.—*D. Reddick*.

2762. BREED, ROBERT S. Some observations on the habitat and distribution of bacteria. [Abstract.] *Absts. Bact.* 6: 11-12. 1922.—The author discusses the use that can be made of the habitat and distribution of bacteria in interpreting the probable evolutionary development of this group of plants.—*D. Reddick*.

2763. BROWN, J. HOWARD. A method for the micro gas analysis of bacterial cultures. [Abstract.] *Absts. Bact.* 6: 5-6. 1922.—A layer of vaseline about 1 cm. thick is added to the culture medium. The vaseline plug acts as a self lubricating piston and remains intact as it is forced up the tube by the gas. An all-glass syringe with a long needle is used as a gasometer. Tests of anaerobic and aerobic uses are described.—*D. Reddick*.

2764. BROWN, J. HOWARD, and PAUL E. HOWE. Transparent milk medium. [Abstract.] *Absts. Bact.* 6: 4. 1922.—The medium is prepared by mixing 1 part of "skim milk," 2 of water, and 0.4 per cent sodium citrate. The mixture is allowed to stand for about 1 hour when it is ready for sterilization. Transparent milk possesses certain advantages over ordinary milk.—*D. Reddick*.

2765. BROWNE, WILLIAM W. Halophilic bacteria. [Abstract.] *Absts. Bact.* 6: 38. 1922.—The biology of *Spirochaeta halophilica* and of *Bacterium halophilicum* is presented in brief.—*D. Reddick*.

2766. BROWNE, WILLIAM W. The staining of halophilic bacteria. [Abstract.] *Absts. Bact.* 6: 25-26. 1922.

2767. BUCHANAN, R. E. Report of the Committee on Taxonomy. [Abstract.] *Absts. Bact.* 6: 1. 1922.—The Committee offers its services in regard to nomenclatorial problems. *Streptococcus lactis* Lister is the correct name for the ordinary lactic acid organism of milk. No agreement has been reached on the use of the term *Bacterium* as a generic name.—*D. Reddick*.

2768. CHAPIN, C. W. Review of our knowledge of *Bacterium tularense*. [Abstract.] *Absts. Bact.* 5: 25. 1921.—The organism causes "deer-fly fever." It is not related morphologically or culturally to the organism of bubonic plague. The only known media on which it can be grown are those containing egg yolk.—*D. Reddick*.

2769. CLARK, P. F., and E. J. MURPHY. Virulent *Micrococcus catarrhalis* widely disseminated in throats during an outbreak of influenza. [Abstract.] *Absts. Bact.* 5: 21-22. 1921.



2770. CONN, H. J. An abundant but little known group of soil bacteria. [Abstract.] Absts. Bact. 5: 8-9. 1921.—The group is characterized as follows: non-spore-forming rods, 0.2-0.5  $\times$  0.4-1.0  $\mu$ , gram-negative, non-motile or with 1 to few polar flagella, gelatin liquefaction slow or absent, growth in liquid media scanty or lacking, but abundant on the surface of agar. Fermentative and reducing activities must be tested on an agar medium instead of in broth.—From 70 to 80 per cent of all the colonies on soil plates are of this type.—D. Reddick.

2771. CONN, H. J. Report of Committee on Bacteriological Technic. [Abstract.] Absts. Bact. 5: 1. 1921.

2772. CONN, H. J. Report of the Committee on Bacteriological Technic. [Abstract.] Absts. Bact. 6: 1. 1922.

2773. DENIER, PIERRE. Les bactéries des nodules des légumineuses. [Rev. of: LÖNNIS, F., and ROY HANSEN. Nodule bacteria of leguminous plants. Jour. Agric. Res. 20: 543-555. Pl. 68-69. 1921 (see Bot. Absts. 8, Entry 1332).] Rev. Bot. Appl. 1: 24-29. 1921.

2774. FISK, E., and E. L. BURKY. Study on the classification of streptococci. Jour. Infect. Diseases 30: 128-140. 1922.—A study was made of the classification of streptococci by the appearance of deep colonies in blood agar, fermentation, and agglutination reactions. Green and hemolytic streptococci were found to be distinct culturally and serologically. The sugar reactions, with the possible exception of inulin fermentation and the reaction of milk, are not indicators of serologic groupings.—Selman A. Waksman.

2775. FITCH, C. P., and D. C. BEAVER. A study of an organism isolated from cases of nephritis in sheep. [Abstract.] Absts. Bact. 5: 17. 1921.—A small, non-motile rod, pathogenic for sheep "has been named *Bacterium nephritidis* var. *ovis*."—D. Reddick.

2776. GILBERT, RUTH, and MARION B. COLEMAN. The relative efficiency of various differential media for the isolation of organisms of the enteric disease group. [Abstract.] Absts. Bact. 6: 35-36. 1922.—Brilliant green agar, eosin brilliant green agar, eosin methylene blue agar, and Endo agar were tested. The first 2 can not be used alone because of the inhibitive action of *B. dysenteriae*. The third has proved very satisfactory.—D. Reddick.

2777. GROUITCH, VERA. Contributions à l'étude de la flore bactérienne du Lac de Genève. [Contributions to a study of the bacterial flora of Lake Geneva.] Bull. Soc. Bot. Genève 12: 246-273. 1920.—Six species of nitrate reducing bacteria were obtained from Lake Geneva. The cultural characteristics of the following new species are given in detail: *a*, found at the surface of the lake, *Bacterium rhodopelagicum*, *Pseudomonas oligotricha*, *P. longicauda*, and *P. genevensis*; *b*, found at a depth of 10 m., *Bacterium pseudomesenteroides*, *Pseudomonas erythraea*, *Micrococcus lacustris*, *Streptococcus lacustris*, *Sarcina lacustris*, and *Bacterium brachycoccum*.—W. H. Emig.

2778. HALL, IVAN C. A differential key for the identification of the sporulating anaerobes. Absts. Bact. 6: 8. 1922.—The key is presented *in toto*.—D. Reddick.

2779. HALL, IVAN C. The production of tyrosine by a putrefactive anaerobe. [Abstract.] Absts. Bact. 6: 6-7. 1922.—*Bacillus centrosporogenes* "n. sp," *B. tyrosinogenes* "n. sp," *B. bifementans*, and *B. histolyticus*, in contrast with other putrefactive anaerobes, seem unable to metabolize tyrosin. A brief description of *B. tyrosinogenes* is presented.—D. Reddick.

2780. HELLER, H. H. Studies of colony formation in deep agar. VI. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 1-17. 8 fig. 1922.—A collection of anaerobic bacilli corresponding in all cultural characteristics may be broken up into groups on the basis of colony formation in deep agar. The shape of the colony depends on the reproductive power

of the organism and its motility in the agar medium, the first depending on the enzymes formed and metabolic activities. A change in these will give rise to a change in colony morphology, which can thus serve as a basis for the study of mutations. Preparation of colonies, their photography, contamination, crowding, permeating growth, uniform conditions, and choice of medium are discussed.—*Selman A. Waksman.*

2781. HEWLETT, R. T. A manual of bacteriology. 8 vo., 818 p. J. and A. Churchill: London, 1921.

2782. HITCHINS, A. PARKER. The advantages of small percentages of agar. II. The biochemical relations of the anaerobic bacilli. [Abstract.] Absts. Bact. 6: 36-37. 1922.

2783. HITCHINS, A. PARKER. The production of yeast "vitamine" in the laboratory for the cultivation of bacteria. [Abstract.] Absts. Bact. 6: 35. 1922.—The method is described in necessary detail.—*D. Reddick.*

2784. HUCKER, G. J. A modification and a new application of the gram stain. [Abstract.] Absts. Bact. 5: 3. 1921.

2785. HUCKER, G. J. Comparison of various methods of gram staining. (Preliminary report.) [Abstract.] Absts. Bact. 6: 2. 1922.—Any one of 4 methods tested is good if a fresh mixture of stain is used and the time of decolorizing is kept under 2 minutes.—*D. Reddick.*

2786. HUCKER, G. J. Preliminary report on the flora of cheddar cheese. [Abstract.] Absts. Bact. 6: 16. 1922.

2787. JONES, F. S. An organism resembling *Bacillus actinoides* cultivated from pneumonic lungs of white rats. [Abstract.] Absts. Bact. 6: 19. 1922.

2788. KAHN, MORTON C. A cultural study of anaerobic spore-bearing bacteria with strains purified by the Barber single cell technique. [Abstract.] Absts. Bact. 6: 9. 1922.

2789. KAYSER, EL. Microbiologie appliquée à la transformation des produits agricoles. 590 p. J. B. Baillière et Fils: Paris, 1921.

2790. KELSNER, R. A. *Bacillus necrophorus*, its activities among equines during the world war. [Abstract.] Absts. Bact. 6: 21. 1922.

2791. KOSER, STEWART A. Differentiation of the paratyphoid-enteritidis group by means of the disaccharid trehalose. [Abstract.] Absts. Bact. 5: 12. 1921.—*Bacillus suispestifer* does not attack trehalose but *B. paratyphosis*, *B. Schottmülleri*, *B. aertryckei*, and *B. enteritidis* ferment trehalose with the production of acid and gas. In a serum water medium containing 0.5 per cent trehalose and 1 per cent Andrade indicator, *B. aertryckei* and *B. enteritidis* produce a red coagulum in 3-4 days, while *B. Schottmülleri* produces only a light pink or colorless coagulum.—*D. Reddick.*

2792. LAYBOURN, R. L. The effect of the reaction of media upon the morphology of the diphtheria bacillus. [Abstract.] Absts. Bact. 5: 14. 1921.—*Bacillus diphtheriae* is longest and most granular on uncoagulated Loeffler blood serum of pH 7.0-7.5. There is a proportional decrease in length and in amount of granulation when grown on media either more acid or more alkaline than the ones indicated.—*D. Reddick.*

2793. LEFEVRE, EDWIN. Pickle and sauerkraut experiments. [Abstract.] Absts. Bact. 6: 24-25. 1922.—Fermentation in weak (5 per cent) and strong (10 per cent) brines has been studied. The essential organism in all brine fermentations is *Lactobacillus Brassicae* Wehmer.—*D. Reddick.*

2794. LEVINE, VICTOR E., and HERMAN M. JAHR. The reducing action of micro-organisms on ammonium molybdate. [Abstract.] Absts. Bact. 5: 4-5. 1921.—Certain organisms reduce ammonium molybdate with the production of a blue coloration. It may prove possible to make use of this reaction as a differential test.—D. Reddick.

2795. LIM, R. K. S. A parasitic spiral organism in the stomach of the cat. Parasitology 12: 108-112. Pl. 7. 1920.—The organism is regarded as a new species of the Spirochaetidae resembling both the genus *Sporonema* and the genus *Treponema*; its exact position in the group is left undetermined. The organism is not common or parasitically important.—C. D. Sherbakoff.

2796. LYON, M. W., JR., and MILO K. MILLER. Case of meningitis in infant due to a thread-like organism. [Abstract.] Absts. Bact. 5: 22. 1921.—An apparently new species of microorganism, *Bacillus trichodiphtheroides*, has been isolated from a case of purulent meningitis.—D. Reddick.

2797. MACINNES, JEAN. A bacterial disintegration of wool. [Abstract.] Absts. Bact. 6: 12. 1922.—Characteristic disintegration does not occur at any temperature unless the wool is very moist.—D. Reddick.

2798. MELLON, RALPH R. Further studies on diphtheroids. Jour. Med. Res. 42: 111-126. 1920-1921.—Additional evidence is presented to support previous publications reporting induced mutations from single cell cultures of the so-called *C. Hodgkini* [see Bot. Absts. 10, Entry 1071]. Certain criticisms made by Ebersson are answered.—J. G. Leach.

2799. MELLON, RALPH R. The diplococcus and bacillary stages of *B. coli* and their possible relation to growth cycles and sexuality. [Abstract.] Absts. Bact. 6: 24. 1922.

2800. MISHULOW, LUCY. Differences in the character of the hemolytic action of streptococci and the relative value of various methods in demonstrating these differences. [Abstract.] Absts. Bact. 6: 36. 1922.

2801. MISHULOW, LUCY, and CHARLES KRUMWIEDE. The existence of different immunological types of *B. pertussis*. [Abstract.] Absts. Bact. 6: 28. 1922.

2802. MORSE, STERNE. A multiple pipette. [Abstract.] Absts. Bact. 6: 11. 1922.

2803. MORSE, STERNE, and NICHOLAS KOPELOFF. A simple method for anaerobic cultivation in petri dishes. [Abstract.] Absts. Bact. 6: 36. 1922.

2804. NEILL, JAMES. A comparative study of different types of streptococci. [Abstract.] Absts. Bact. 6: 32. 1922.

2805. NORTON, JOHN F., and MARY V. SAWYER. Indol production by bacteria. [Abstract.] Absts. Bact. 5: 2. 1921.—Trypsinized peptone or casein is the best medium. Erlich's reagent is the most reliable.—D. Reddick.

2806. ORLA-JENSEN. Dairy bacteriology. 8 vo., 192 p. J. and A. Churchill: London, 1921.

2807. PAXSON, W. H., and EDWARD REDOWITZ. *Bacillus diphtheriae*. Immunological types and toxin-antitoxin relationship. [Abstract.] Absts. Bact. 6: 28. 1922.

2808. PRYER, R. W. The alkali producing organism in scarlet fever. [Abstract.] Absts. Bact. 5: 22. 1921.—The organism has been found only in cases of scarlet fever. "It is probably not a true bacterium" but may be a yeast. Its cultural characters are noted.—D. Reddick.

2809. REDDISH, GEORGE F., and LEO F. RETTGER. A cultural and biochemical study of certain known anaerobes. [Abstract.] Absts. Bact. 6: 7. 1922.

2810. REDDISH, GEO. F., and LEO F. RETTGER. An investigation into the purity of strains of *Bacillus botulinus* obtained from different sources in this country. [U. S. A.] [Abstract.] Absts. Bact. 5: 14. 1921.—Attempts to obtain pure cultures of a toxic strain of *B. botulinus* were unsuccessful. *Bacillus sporogenes* is usually a contaminant in American cultures. Toxic strains of *B. botulinus* ferment sucrose with production of gas whereas the non-toxic strain does not.—D. Reddick.

2811. REDDISH, GEORGE F., and LEO F. RETTGER. Clostridium putrifaction (*B. putrificus* Bientock) a distinct species. [Abstract.] Absts. Bact. 6: 9. 1922.

2812. RETTGER, LEO F., and WALTER L. KULP. A note on the choice of culture media for the study of *Lactobacillus* with special reference to the carbohydrates employed. [Abstract.] Absts. Bact. 6: 24. 1922.—An agar medium containing 0.5–1 per cent galactose is a good substitute for whey broth and whey agar in the cultivation of *Lactobacillus acidophilus*.—D. Reddick.

2813. RIVERS, T. M., and ERIDA L. LEUSCHNER. Hemolytic influenza bacilli. [Abstract.] Absts. Bact. 5: 21. 1921.—The name influenza bacilli is urged for a group of unclassified bacteria usually found in throat cultures, the characters of which are briefly described.—D. Reddick.

2814. ROOS, C., and E. C. EARLE. Studies on the group IV pneumococci. [Abstract.] Absts. Bact. 6: 28. 1922.

2815. ROOS, C., and E. MAY GRAY. Studies upon Streptococcus. II. Cultural versus biological classification. [Abstract.] Absts. Bact. 5: 15. 1921.—“The older cultural methods are inadequate for the classification of certain types of pathogenic microorganisms, notably streptococci.”—D. Reddick.

2816. SCHNEIDER, ALBERT. The microbial symbionts of the tongue and alveoli in health and in pyorrhea alveolaris. [Abstract.] Absts. Bact. 5: 21. 1921.

2817. SHERMAN, J. M. Some notes on the lactobacilli. [Abstract.] Absts. Bact. 5: 6. 1921.

2818. SHERMAN, J. M., and W. R. ALBUS. The cultivation of certain of the lactobacilli. [Abstract.] Absts. Bact. 6: 17. 1922.—A satisfactory medium for propagation of lactobacilli contains 1 per cent each of a fermentable carbohydrate, peptone, dried yeast, butter fat, and 0.1 per cent agar; the reaction is adjusted to pH 6.5–7.0.—D. Reddick.

2819. STRIEGEL, KARL. Über Typhus abdominalis. Paratyphus B u. A. 8 vo., 62 p. Diss. Erlangen, 1920.

2820. VOGEL, J., und ZIPFEL. Beiträge zur Frage der Verwandtschaftsverhältnisse der Leguminosen-Knöllchenbakterien und deren Artbestimmung mittels serologischer Untersuchungsmethoden. [Contribution to the question of relationships of the legume-nodule bacteria and their specific determination by serologic methods.] Centralbl. Bakt. II Abt. 54: 13–34. 1921.—This is a detailed study of the preparation of immune sera with cultures of *Bacillus radicicola*. The groups of legume bacteria were separated by means of agglutinin and precipitin reactions. By the use of homologous sera, the leguminous bacteria can be separated into several groups, agreeing with those found by inoculation tests. 1. *Lupinus* bacteria.—Immune serum from *L. angustifolius* bacteria agglutinates in an equal measure to

homologous bacteria; also those of *L. luteus*, *L. perennis*, *Ornithopus sativus*, without leaving any influence on species II to VI.—II. *Trifolium* bacteria.—Immune serum from *T. pratense* bacteria agglutinates, in addition to homologous bacteria, also those of *T. incarnatum*, *T. repens*, and *T. hybridum*, and has no action on the other 5 species.—III. *Medicago* bacteria.—Immune serum from *Medicago sativa* bacteria agglutinates, in addition to homologous bacteria, also those of *M. lupulina*, *Melilotus albus*, and *Trigonella Foenum graecum*, and has no other action on the other 5 species.—IV. *Pisum* bacteria.—Bacteria from *P. sativum* agglutinate, in addition to the homologous form, only the bacteria of *Vicia sativa*.—V. *Faba* bacteria.—Immune serum of *Phaseolus vulgaris* agglutinates only homologous bacteria and no others.—This method of serum agglutination can also be applied to the study of legume bacteria found in the soil. *Azotobacter Chroococcum* and *Bacillus radicola* are found to have no relation whatever when studied by means of serum agglutination.—Anthony Berg.

2821. WARD, ARCHIBALD R. The etiology of polyarthrits in swine. [Abstracts.] Absts. Bact. 6: 22. 1922.—*Bacterium erysipelatis-suis* is the etiologic agent.—D. Reddick.

2822. WYANT, ZAE NORTHROP. A new upright counting apparatus for plate cultures. [Abstract.] Absts. Bact. 5: 209. Pl. 1-2. 1921.

2823. WYANT, ZAE NORTHROP. A simple cremator. Absts. Bact. 5: 209-210. Pl. 3. 1921.—A metal cylinder 30 × 6.5 cm., closed at one end except for a hole large enough to admit a gas burner, is placed over the flame used for sterilizing transfer needles. Sputtering droplets fall against the hot metal and are instantly evaporated.—D. Reddick.

#### MYXOMYCETES

2824. BUCHET, S. A propos d'un récent travail sur les Myxomycètes. [Concerning a recent work on the Myxomycetes.] [Rev. of: SKUPIENSKI, F. X. Recherches sur le cycle évolutif de certains Myxomycètes. (Investigations on the life history of certain Myxomycetes.) Thesis Paris, 1920.] Bull. Trimest. Soc. Mycol. France 37: 39-43. 1921.—Skupiencki has published a thesis on the morphology and development of some Myxomycetes in which he has made statements which the author regards as inaccurate or without proof. He has failed to give former workers in this field the credit for their discoveries. The identification of *Didymium nigripes* is incorrect. His conclusion that the yellow color of the plasmodium is caused by bacteria is without proof. Skupiencki has a false conception of the sclerotium in Myxomycetes. His statement that plasmodia are able to "eat gelatin" must be questioned.—[See also Bot. Absts. 11, Entries 2825, 2827.]—D. S. Welch.

2825. BUCHET, S. Réponse à M. Skupiencki. [A reply to Mr. Skupiencki (see Bot. Absts. 11, Entry 2827).] Bull. Trimest. Soc. Mycol. France 37: 83-87. 1921.—The author reaffirms the statements which he has made in his recent review [see Bot. Absts. 11, Entry 2824] concerning the work of Skupiencki. He assures the latter that his criticism is impersonal and again invites him to a personal conference in his own laboratory where his knowledge and experience may receive a fair test. After reviewing his arguments in rebuttal the author states that it is his intention to consider the discussion closed.—D. S. Welch.

2826. MATZ, J. A new vascular organism in sugar cane. Jour. Dept. Agric. Porto Rico 4: 41-46. Fig. 7-9. 1920.—An organism, here named *Plasmodiophora vascularum* n. sp., was found in the annular and spiral tracheides and pitted vessels in the vascular bundles in the lower internodes of cane suffering from yellow-stripe and top-rot disease.—Geo. H. Dungan.

2827. SKUPIENSKI, F. X. Réponse à la critique de M. Buchet, concernant un récent travail sur les Myxomycètes. [Reply to a criticism.] Bull. Trimest. Soc. Mycol. France 37: 44-53. 1921.—The author discusses the objections raised by his critic and disposes of each of them in turn. [See also Bot. Absts. 11, Entry 2825.]—D. S. Welch.

2828. WANN, F. B., and W. C. MUENSCHER. A preliminary list of the Myxomycetes of the Cayuga Lake basin. *Mycologia* 14: 38-41. 1922.—About 800 specimens of slime moulds collected in central New York form the basis of the present list comprising "92 species, in 30 genera and 11 families."—H. R. Rosen.

## PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 2449, 2517, 2649, 3228)

2829. BARTRUM, J. A. Note on the Port Waikato Mesozoic flora. *New Zealand Jour. Sci. and Tech.* 4: 258. 1921.—The author records the following additions to the fossil flora found near Port Waikato, New Zealand: *Araucarites cutchensis* Feist., *Coniopteris hymenophylloides* (Brongn.), *Stachylotaxus* (?) c. f. *elegans* Nath., *Elatocladus plana* (Feistm.).—E. W. Berry.

2830. BERRY, E. W. A new genus of fossil fruit. *Amer. Jour. Sci.* 3: 251-253. 2 fig. 1922.—*Calatoloides eocenicum*, a new genus and species of Icacinaceae, is described from the Wilcox Eocene of Texas.—E. W. Berry.

2831. BERRY, E. W. Additional occurrences of Pleistocene plants. *Torrey* 22: 10-11. 1922.—From a railroad-cut near Mountain Creek, Chilton County, Alabama, are recorded *Pinus glabra* Walt., *Arundinaria* sp. (probably *macrosperma* Michx.), and *Hicoria* sp., (probably *minima* (Marsh.) Britton).—From a 35-foot well in the loess  $\frac{1}{2}$  miles northwest of Covington, Tipton County, Tennessee, are reported fruits or seeds of *Carex* sp., *Persicaria* sp., *Meibomia paniculata* (L.) Kuntze, and *Viburnum* sp. (probably *nudum* L.).—J. C. Nelson.

2832. BERRY, E. W. Carboniferous plants from Peru. *Amer. Jour. Sci.* 3: 189-194. 1922.—The author describes a small Carboniferous flora from the peninsula of Paracas in southern Peru.—E. W. Berry.

2833. BERRY, E. W. The flora of the Cheyenne sandstone of Kansas. *U. S. Geol. Surv. Professional Paper* 129: 199-225. *Pl.* 48-61. 1922.—The author describes a flora of 23 species from the Cheyenne sandstone of southern Kansas and determines its age as Upper Cretaceous. The flora comprises 4 ferns, 2 cycadophytes, 4 gymnosperms, 1 monocotyledon, and 12 dicotyledons—the last including a new species of fruit and a new *Sapindopsis*.—E. W. Berry.

2834. BERRY, E. W. The flora of the Woodbine sand at Arthurs Bluff, Texas. *U. S. Geol. Surv. Professional Paper* 129: 153-181. *Pl.* 38-40. 1922.—The author describes 43 species of mostly well known Upper Cretaceous plants from the Woodbine formation of Arthurs Bluff, Texas, and concludes that they correspond in age with the Turonian stage of the European Upper Cretaceous. The only noteworthy new form is the new genus *Trochodendroides* considered to be ancestral to the existing *Trochodendraceae*.—E. W. Berry.

2835. CARPENTIER, A. Note sur quelques végétaux à structure conservée des environs de Ste. Marie aux-Mines (Alsace). [Note concerning some plants with structure preserved in the vicinity of Ste.-Marie- aux-Mines (Alsace).] *Rev. Gén. Bot.* 33: 684-693. *Pl.* 34. 1921.—In a fragment of silicified hacksel from the vicinity of Sainte-Marie- aux -Mines (Alsace), the author found a petiole of the genus *Myeloxylon*; leaves of *Alethopteris Grandini*; minute leaves with curved edges, and well developed palisade tissue; small roots perfectly preserved; some leaves of the Cordaitales; a leaf trace of the primary petiole of *Anachoropteris* (*Zygopterideae*); and sporangial rings. Notes and comparisons with other specimens are included.—J. C. Gilman.

2836. COCKERELL, T. D. A. A fossil buttercup. *Nature* 109: 42-43. 1 fig. 1922.—The author describes an achene of *Ranunculus florissantensis* n. sp. from Miocene shale at

Florissant, Colorado. The achene shows 2 seeds. It would be interesting to determine whether any of the present species have at first 2 ovules.—O. A. Stevens.

2837. DARWIN, LEONARD. Organic evolution, outstanding difficulties and possible explanations. Cambridge University Press, 1921.

2838. FRENTZEN, K. Keuperflora und Lunzer Flora. [Keuper flora and Lunz flora.] Centralbl. Min. Geol. u. Paleo. 1: 23-28. 1922.—The author concludes that the Lunz flora is contained in the equivalent of the Schilfsandstein and is lower middle Keuper in age.—E. W. Berry.

2839. FRITEL, P. H. Contribution à l'étude des flores tertiaires. [Contributions to the study of tertiary floras.] Bull. Mus. Nat. Hist. [Paris] 27: 471-476. 1921.—This comprises an enumeration of the lower Miocene flora of Oropo, Greece, and an account of the discovery of the fruits of the Nipa palm (*Nipadites Burtini*) in the lower Eocene (Ypresian) at Gau, Basses-Pyrenees, France.—E. W. Berry.

2840. KURTZ, F. Atlas de las plantas fósiles de la Republica Argentina. [Atlas of plant fossils from Argentina.] Actas Acad. Nacion. Cien. Cordoba 7: 133-153. Pl. 1-27. 1921.—This is a posthumous publication of the notes and illustrations of fossil plants from the Argentine Republic prepared by Prof. Kurtz of Cordoba. The work is more or less disjointed owing to its nature but is most important since here is figured for the first time a large number of fossil plants from the Rhaetic, Lias, and Permian of Argentina. New species are proposed in the genera *Danaeopsis*, *Acrocarpus*, *Sphenopteris*, *Sphenopteridium*, *Rhacopteris*, *Odonopteris*, *Archaeopteris*, *Bergiopteris*, and *Neuropteridium*.—E. W. Berry.

2841. LINDENBEIN, H. Les Protophycees (*Gloeocapsomorpha prisca* Zalesky) une flora marine du Silurien inferieur de la Baltique. [A marine alga of the Lower Silurian of the Baltic.] Bull. Soc. Bot. Genève 12: 274-292. Fig. 1-7. 1920.—Microscopic sections of a Silurian bituminous schist present cell groups resembling *Gloeocapsa* of the Cyanophyceae, though the radiating arrangement of the dichotomously branched rows of cells is more like that of the epiphytes of the Coleochetaceae. The author would classify this fossil alga in a separate family somewhere between Cyanophyceae and Rhodophyceae.—W. H. Emig.

2842. PAX, F. Die fossile Flora von Uesküb in Mazedonien. [The fossil flora of Uesküb in Macedonia.] Bot. Jahrb. 57: 302-319. 1921.—The paper is based on collections made by Dr. Gripp in 1918 and includes about 35 named species and several yet unnamed, belonging to the following families: Taxaceae, Pinaceae, Typhaceae, Gramineae, Myricaceae, Juglandaceae, Betulaceae, Fagaceae, Magnoliaceae, Lauraceae, Hamamelidaceae, Leguminosae, Simarubaceae, Anacardiaceae, Aquifoliaceae, Celastraceae, Aceraceae, Rhamnaceae, Ericaceae, and Oleaceae. No new forms are described. The relation of this to other Tertiary floras is discussed, this flora probably belonging to the Miocene. The fossil flora of Uesküb represents the remains of a forest vegetation of which trees and a few shrubs only were preserved. Of the herbs nothing is known except in the case of *Typha* and a few remains of grasses. The climate was comparable to that of warmer East Asia and warmer North America. The occurrence of leathery leaves suggests a warm climate. The flora shows a strong relationship with the present flora of North America and East Asia, but is little related to that of Eurasia and the Mediterranean. A few cases show a slight affinity with tropical floras. The affinities are similar to those shown for other European Tertiary floras. The flora is a mixture of Engler's arcto-tertiary and tertiaryboreales elements. Several species are noted which have probably sprung from corresponding species of the Tertiary in the same region, as for instance *Juglans regia* from *J. acuminata*, *Castanea sativa* from *C. atavia*, etc.—K. M. Wiegand.

2843. ROUND, EDA M. *Annularia* with *Paleostachya* fruit. Bot. Gaz. 73: 326-328. Fig. 2. 1922.—The author describes fruiting specimens of a new species, *Annularia Clarkii*, from the Rhode Island Coal basin, which shows that the *Paleostachya* type of cone is associated with the *Annularia* type of foliage, thus disproving the statement of Scott and some other writers on the subject.—E. W. Berry.

2844. THOMAS, H. H. [Rev. of: ARDER, E. A. NEWELL. *Devonian floras: a study of the origin of Cormophyta*. 100 p., 47 fig. Cambridge University Press: 1921.] Jour. Botany 59: 357-358. 1921.

2845. WEIDENREICH, F. Das Evolutionsproblem und der individuelle Gestaltungsanteil am Entwicklungsgeschehen. [The problem of evolution and the individual form function in development.] J. Springer: Berlin, 1921. 48 marks.

2846. WIELAND, G. R. Devonian plants. Science 55: 427-428. 1922.

## PATHOLOGY<sup>1</sup>

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 2072, 2120, 2127, 2135, 2139, 2151, 2152, 2164, 2165, 2181, 2183, 2213, 2224, 2241, 2246, 2273, 2334, 2351, 2356, 2367, 2374, 2383, 2385, 2388, 2411, 2419, 2429, 2445, 2459, 2496, 2499, 2504, 2505, 2510, 2511, 2520, 2526, 2535, 2567, 2617, 2639, 2665, 2679, 2680, 2681, 2682, 2683, 2684, 2686, 2692, 2701, 2710, 2719, 2720, 2740, 2746, 2759, 2773, 2820, 2826, 3066, 3074, 3076, 3080, 3084, 3086, 3098, 3099, 3105, 3106, 3110, 3114, 3115, 3121, 3158, 3161)

## DISEASES CAUSED BY FUNGI

2847. ANONYMOUS. Potatoes.—Varieties immune from black scab or wart disease, 1921. Jour. Dept. Agric. Ireland 21: 477-482. 1921.—Certain immune varieties are considered with reference to their replacing common susceptible varieties.—Donald Folsom.

2848. ANONYMOUS. Yellow-leaf disease of *Phormium tenax*. [Abstract and discussion of: COCKAYNE, A. H. Yellow-leaf disease of *Phormium tenax*. New Zeal. Jour. Sci. and Tech. 4: 34-35 1921.] New Zealand Jour. Agric. 22: 297-298. 1921.—The fungus *Ramularia Phormii* was isolated and considered the probable cause of the disease.—N. J. Giddings.

2849. BLACKMAN, V. H. The nature of immunity from wart disease. Rept. Internat. Potato Conference. p. 92. Roy. Hort. Soc.: London, 1921 [1922].—Investigations are in progress but as yet there is no certain knowledge as to whether resistance depends on anatomical or physiological factors. It seems quite likely that susceptibility may depend on a balance or lack of balance between the physiological processes of the host cell and the parasite.—Frederick V. Rand.

2850. BOTTOMLEY, A. M. Note on *Urophlyctis* *Alfalfae* on lucerne. Jour. Dept. Agric. Union South Africa 4: 153-155. 1 fig. 1922.—The disease caused by *Urophlyctis Alfalfae* is described and its economic importance discussed in view of the restrictions recently imposed on the importation of lucerne seed into the Union.—E. M. Doidge.

<sup>1</sup>The present subdivisions of this section are tentatively offered as pigeon-holes for pathological literature with the idea merely of facilitating the search for specific material and without deference to any particular pathological point of view.



2851. BOYCE, J. S. **The dry-rot of incense cedar.** U. S. Dept. Agric. Bull. 871. 58 p., 3 pl., 3 fig. 1920.—The importance of incense cedar (*Libocedrus decurrens* Torr.), total-loss factors, dry-rot and secondary rots, and relative importance and control of dry-rot are discussed.—The results of this study indicate that the classing of incense cedar as an inferior species for lumber is due to the uniformly high percentage of injury caused by the dry-rot fungus, *Polyporus amarus* Hedg. Dry-rot can be largely eliminated by intensive fire protection, but can not be entirely controlled in this way because of other mechanical injuries, such as pruning, lightning, and frost, which also open the way to infection.—*Frederick V. Rand.*

2852. BRERETON, W. LeGAY, C. O. HAMBLIN, AND W. B. STOKES. **Black spot of pear and apple. Some orchard experiments.** Agric. Gaz. New South Wales 33: 123-130. 3 fig. 1922.—The black spot of pear and apple caused by *Venturia inaequalis* (Cke.) Aderh., known in the U. S. A. as pear and apple scab, is found in Australia. The conidial or summer stage is very common in New South Wales and this article shows that the winter or ascospore stage is also present. Extensive spraying experiments were carried on in a commercial pear orchard with lime-sulphur and Bordeaux sprays. The former was found to be injurious. Bordeaux at a 6-4-50 strength (with lead arsenate) sprayed twice gave good control on the coast. Later trials with Bordeaux (6-4-80) also gave effective control. Methods of control of black spot on apple were not determined. Methods and results of spraying are tabulated in detail, and general control and spraying methods are outlined.—*L. R. Waldron.*

2853. BRIERLEY, WILLIAM B. **Some research aspects of the wart disease problem.** Rept. Internat. Potato Conference p. 93-104. Roy. Hort. Soc.: London, 1921 [1922].—Immune varieties, stability of host and of fungous parasite, nature of immunity to disease, relation between disease and external factors, and soil sterilization are discussed in relation to the wart disease.—Since many susceptible varieties yield heavier crops than corresponding immune varieties, and since many of the well known and popular varieties are susceptible, whereas the immune sorts are more restricted in their time of ripening and often poorer in quality, the problem of breeding better immune varieties is still a live one.—Deterioration of yield in northern grown seed in the south may occur, but no authentic case is known of a breaking down in their distinctive quality of varieties immune to wart disease. Since sexual fusion occurs in the fungus, there would appear to be no certainty of germinal stability, and until the vital question of the genetic stability of fungi and bacteria is settled there is no absolute security of tenure for immune varieties.—The immune varieties are divided discontinuously from the others; the former are a homogeneous body, whereas the latter show a continuous range from high resistance to complete susceptibility, depending on germinal potentialities and environmental conditions. The suggestion is strong of the presence of some perfectly specific substance which is an integral factor in the metabolic structure of the immune varieties; while the differing susceptibilities of the other group might indicate a structural basis such as differential thickness or tensile strength of the cuticle or turgidity of the cell.—Can cultural treatment increase the resistance of susceptible varieties or retard the physiological activities of the fungus?—The only safe and final solution of the wart disease problem is the killing of the causal organism. Extensive soil sterilization experiments are being conducted at Rothamsted and Ormskirk.—*Frederick V. Rand.*

2854. BROWN, WILLIAM. **Studies in the physiology of parasitism. VIII. On the exosmosis of nutrient substances from the host tissue into the infection drop.** Ann. Botany 36: 101-120. 1 fig. 1922.—The passive exosmosis of nutrient material from the host cells through the cuticle into the infection drop is an important factor in the infective power of some fungi. In *Botrytis* the incidence of attack of beans is dependent on whether sufficient nutrient material is present in the infection drop to enable the fungus to germinate and penetrate the cuticular layer. In all the tests made it was found that drops of water when laid on the surface of plant structures showed an increase of conductivity which in several instances was accompanied by an increased capacity for stimulating germination.—*Lillian C. Cash.*

2855. BURK. Versuche mit der Saatbeize "Segetan I." [Experiments with "Segetan I" as a seed treatment against smut.] Fühling's Landw. Zeitg. 70: 471-475. 1921.—New liquid fungicides, Segetan I, an ammonium compound of organic and inorganic acid salts of copper with cyanide of mercury, and Segetan II, an ammonium compound of organic and inorganic salts of copper with cyanide of silver, were tested as seed treatments for wheat smut caused by *Tilletia Tritici*. Both materials were found to be fully effective and did not injure the seed.—A. T. Wiancko.

2856. CERASOLI, ERCOLE. Intorno alla solubilizzazione dei composti cuprici anticrittogamici sulla superficie degli organi verdi della vite. [The solubility of fungicidal copper compounds on the surface of green parts of grape vines.] Riv. Patol. Veg. 11: 70-72. 1921.—When grape foliage attacked by *Peronospora* and sprayed or dusted with Bordeaux mixture was immersed in distilled water it gave the latter an acid reaction whereas healthy leaves so treated did not.—F. M. Blodgett.

2857. CHEVALIER, AUG. Sur une maladie des agaves. [Concerning a disease of the agave.] Rev. Bot. Appl. 1: 21-23. 1921.—Brown, elliptic spots which had been noticed for a long time on the lower leaves of sisal (*Agave rigida* Mill.), and also on the leaves of *A. americana* L., in French Indo China, the French Sudan, and southeastern France, proved to be caused by *Colletotrichum agaves* Cavara. Removing and burning the affected leaves is recommended.—P. G. Russell.

2858. CIFERRI, R. Sul parassitismo secondario dell' "Aspergillus varians" Wehm. e un parassita di esso. [On the secondary parasitism of *Aspergillus varians* Wehm. and a parasite of the latter.] Riv. Patol. Veg. 11: 89-93. 1921.—*Aspergillus varians* was found growing on kernels of maize that had developed on the extranities of ears of plants growing in soil of low humidity. *Cephalosporium acremonium* Corda was frequently found as a parasite on the *Aspergillus*.—F. M. Blodgett.

2859. CIFERRI, R. Un intenso attacco del "Rhytisma acerinum" (Pers.) Fr. alle foglie d'*Acer campestre*. [A severe attack of *Rhytisma acerinum* on the foliage of *Acer campestre*.] Riv. Patol. Veg. 11: 93-95. 1921.—In the province of Macerata where living trees are used to support grape vines there occurred a severe outbreak of the disease caused by *Rhytisma acerinum* on the foliage of *Acer campestre*. Considerable losses resulted from the death of the trees and the loss of the leaves, which are used for forage. The disease was not controlled either by dustings with sulphur or by spraying with Bordeaux mixture. The disease was epidemic only in a limited humid zone.—F. M. Blodgett.

2860. CIFERRI, R. Una nuova malattia del pomodoro: la "carie." [A new rot disease of the tomato.] Riv. Patol. Veg. 11: 65-69. 1921.—A fungus belonging to the genus *Phoma* but differing from other *Phomas* described on the host was found on decaying tomatoes. Successful inoculations were made using spores scraped from the tomato or the infected pulp. The fungus is named *Phoma ferrarisi* n. sp. A *Ramularia* was also found in these fruits.—F. M. Blodgett.

2861. CIFERRI, R. Una nuova malattia della *Buddleia variabilis* dovuta alla *Phyllosticta Montemartini* n. sp. [A new disease of *Buddleia variabilis* due to *Phyllosticta Montemartini* n. sp.] Riv. Patol. Veg. 11: 114-115. 1921.—*Phyllosticta Montemartini* n. sp. is described as causing a leaf spot on *Buddleia variabilis*, which is grown as an ornamental plant and as a source of nectar.—F. M. Blodgett.

2862. DETWILER, S. B. Blister rust appears in the Puget Sound region. Amer. Forestry 28: 97-98. 1 map. 1922.

2863. DONKIN, J. E. Bunt-resistant wheat. Jour. Dept. Agric. Union South Africa 4: 561-563. 1922.—Of 20 varieties of wheat tested for resistance to bunt, caused by *Tilletia Triticici*, the durum, polonicum, and turgidum types showed evident resistance, but these are not first class milling wheats.—E. M. Doidge.

2864. DUCOMET, VITAL. Oïdium de la pomme de terre et Oïdium de la betterave. [Oidium on potato and beet.] Bull. Soc. Path. Vég. France 8: 153-154. 1921.—*Erysiphe cichoracearum* DC.? attacks the following varieties of potato in the west of France: l'Industrie, The Factor, Majestic, and Saucisse. Institut de Beauvais is resistant.—Another undetermined Oidium attacks beets.—Jean Dufrenoy.

2865. DUFRÉNOY, J. Les fanaisons de plantes par les Fusarium. [Blighting of plants by *Fusarium* spp.] Rev. Bot. Appl. 1: 239, 240. 1921.—This is a review of a number of recent papers on wilts and blights caused by *Fusarium* spp.—P. G. Russell.

2866. DURRELL, L. W., and JOHN H. PARKER. Comparative resistance of varieties of oats to crown and stem rusts. Iowa Agric. Exp. Sta. Res. Bull. 62, 27-56. 1920.—Some 200 lots of oats were tested for rust resistance from 1914 to 1918. The oats were artificially infected both in field and greenhouse, and the degree of rust was estimated according to the scale used by the U. S. Department of Agriculture. Infection was most satisfactorily produced by dusting the spores on wetted leaves by means of a blower. The greater susceptibility of seedlings to rust attack is pronounced, and the growth and maturity of rust is more rapid on young than on older plants. There is, within limits, a direct ratio between the number of spores applied to a leaf and the amount of infection obtained.—Varieties of the red-oat group, *Avena sterilis*, showed more resistance to crown rust than those of the common oat group, *A. sativa*. Apparently more varieties of oats are resistant to crown than to stem rust, though but few are extremely resistant to crown rust when subjected to a severe epidemic. White and Green Russian, Ruakura, and *A. barbata*, *A. orientalis mutica*, and *A. sativa grisea* show a high degree of resistance to stem rust under rust nursery conditions. Only *A. sativa* and varieties Green Russian and Ruakura were markedly resistant to both rusts.—A study of the effect of time of seeding on degree of infection indicates that crown rust infection is greater on the earlier sown oats, and stem rust infection is slightly greater on later seedings.—Florence S. Willey.

2867. EARLE, F. S. Sugar cane root disease. Jour. Dept. Agric. Porto Rico 4: 3-27. 1920.—The symptoms of the serious root rot disease of sugar cane in Porto Rico are lack of vigor, yellowing and rolling of the blades, occurrence of top rot, development of the rind disease, and failure to ratoon. The rotting of the roots is attributed to certain facultative parasites which the author refers to as various species of *Rhizoctonia* and a species of *Pythium*. A strict parasite of a myxomycetous nature was found rather consistently within the vascular bundles of affected cane. It is thought that this organism lowers the vitality of the host and that this enables the facultative parasite to attack the plant, thus giving rise to the top rot and rind disease. Extensive varietal experiments show a wide difference in resistance to root rot, varying from practical immunity in Kavangire and the North India canes to high susceptibility in Otaheite.—Geo. H. Dungan.

2868. ELLIOTT, JOHN A. A new *Ascochyta* disease of cotton. Arkansas Agric. Exp. Sta. Bull. 178. 13 p., 4 pl., 1 fig. 1922.—The disease appeared as a destructive blight following a period of continued rainfall. It begins as a leaf spot and spreads rapidly to all aerial parts of the plant, and under favorable conditions assumes the form of a blight on cotton plants comparable to "fire blight" on pears.—The causative organism was easily isolated and numerous successful inoculations were obtained. Inoculations by means of spore suspensions were possible only under conditions of high humidity, and the advance of the disease was checked completely by dry weather.—The fungus mycelium advances through the host tissues by mechanical penetration. The formation of pycnidia closely follows the advance of the

mycelium, the life cycle being completed in 5-6 days. The fungus was found to live over winter as a saprophyte on dead cotton stalks in the field and to infect the young cotton plants the following spring. Crop rotation is suggested as a means of control. Circumstantial evidence indicates that the disease is restricted to the region in which it was found.—W. B. Grove identified the fungus as *Ascochyta Gossypii* Sydow.—John A. Elliott.

2869. ERIKSSON, JAKOB. The life of *Puccinia Malvacearum* Mont. within the host plant and on its surface. *Phytopathology* 11: 459-463. 1921.—Extracts from the results of several years work with hollyhock rust are given under 3 headings, as follows: diseased and sound hollyhock races, watering of the culture soil with fungicides, and germination of the spores. It was found that infection may be divided into 2 periods, the 1st or summer stage (May-July) and the 2nd or autumn stage (July-October). During the 1st period no infection occurred on a sound race, although the plants were growing near plants of a badly diseased race; but after July infection became severe on all plants in the experiment. By watering plants of a diseased race with copper sulphate solutions of various concentrations the amount of rust developing during the summer period was reduced. But the sulphate had no apparent effect during the autumn period. Although all the spores of this rust are 2-celled, they are biologically of 2 types. In germination, the summer spores always send out long germ tubes from the ends of which conidia are abstracted. These conidia, when placed on a hollyhock leaf, empty their protoplasm into a host cell from which it passes into the interior cells of the leaf as mycoplasma; but pustules are not produced immediately. The autumn type of spores when germinated in moist air or on the surface of water produce promycelium and sporidia which infect the host by means of a germ tube and produce pustules in 8-10 days. If submerged in water the autumn spores germinate in a manner similar to that of the summer spores.—B. B. Higgins.

2870. ERIKSSON, JAKOB. The mycoplasma theory—is it dispensable or not? *Phytopathology* 11: 385-388. 1921.—Studies on seed infection by the grain rusts by Pritchard, Beauverie, and Hungerford are discussed briefly. The results of attempts to obtain seedling infection from the sorus-bearing seed are negative, and therefore the hypothesis that the intraseminal sori constitute a mode of hibernation for the rust fungus must be abandoned.—A brief description is given of the structure and the transition into mycelium of the mycoplasma of *Phytophthora infestans* (Mont.) deBary and of *Peronospora Spinaciae* (Grev.) Laub. In both cases it can be detected first as a finely granular colloidal mixture of the protoplasm from host and parasite, existing symbiotically in the host cell. Later the mycoplasma assumes an antibiotic phase; the nucleus, plastids, and other elements of the host protoplasm are destroyed; and the mycoplasma is then ripe and ready to issue forth as mycelium.—The existence of a mycoplasma symbiosis stage in the life history of several other parasitic fungi is suggested.—B. B. Higgins.

2871. ERWIN, A.T. Controlling downy mildew of lettuce. *Iowa Agric. Exp. Sta. Bull.* 196. 307-329. 1921.—Downy mildew of lettuce, caused by *Bremia Lactucae*, is increased by cloudy weather. The fungus may develop on wild lettuce, hence plants in the vicinity of forcing houses should be destroyed. Well ventilated houses and dry foliage are important to check the growth and spread of the disease. Since downy mildew is usually a seedling disease, control measures should be effected during the early stages. Bordeaux mixture (4-4-50) is recommended for control, 2-3 applications being necessary.—Florence S. Willey.

2872. FARIS, JAMES A. Violet root rot (*Rhizoctonia crocorum* DC.) in the United States. *Phytopathology* 11: 412-423. 1921.—*Rhizoctonia crocorum* DC. was studied on the Irish potato. The fungus forms a dense mat of mycelium, usually violet colored, which often tends to form strands over the underground parts of the plants. From this superficial mycelium infection threads are pushed between the cells of young or soft tissues such as the eyes of tubers. These internal hyphae pass through the intercellular spaces of the cortex. They occasionally enter a cell cavity and, branching profusely, initiate the so-called infection cushions. Previous work with the fungus is summarized.—B. B. Higgins.

2873. GARD, MÉDÉRIC. A propos de la germination des conidies du mildiou de la vigne (*Plasmopara viticola* (Berk. et Cur.) Berl. et de Toni.). [Germination of conidia in mildew of the vine.] Bull. Soc. Path. Vég. France 8: 130-131. 1921.—The conidia germinate well at the surface of the water. Covered with a film in a drop of water or submitted to violent agitation the conidia do not germinate.—Jean Dufrenoy.

2874. HAMBLIN, C. O. "Foot rot" of wheat caused by the fungus *Helminthosporium*. Agric. Gaz. New South Wales 33: 13-19. 7 fig. 1922.—In 1921 damage caused by this disease in New South Wales varied from 2 or 3 up to 85 and 90 per cent, probably far more damage than from the well-known take-all. The macroscopic appearance of the 2 diseases is similar but a field distinction can generally be made. Symptoms produced by "foot rot" are similar to those of the *Helminthosporium* disease described from the U. S. A. Measures of control suggested are better rotation methods, use of bare fallow, early seed bed preparation, use of good seed, and use of superphosphate. A scientific report of the disease is promised.—L. R. Waldron.

2875. HARTLEY, CARL. Damping-off in forest nurseries. U. S. Dept. Agric. Bull. 934. 99 p., 1 pl., 20 fig. 1921.—Among the phases of the subject discussed are damping-off in general; damping-off of conifers, including the relative importance of several causal fungi; damping-off fungi as causes of root-rot and late damping-off; and the relation of environmental factors such as density of sowing, moisture and temperature, and chemical and biological factors.—In nurseries damping-off is caused mainly by seedling parasites non-specialized as to host; *Pythium Debaryanum* Hesse and *Corticium vagum* B. & C. are probably the most important of these. *Fusarium* spp., *Rheosporangium aphanidermatus* Edson, *Phytophthora* spp., *Pythium artotrogus* (Mont.) De Bary, and *Botrytis cinerea* Pers. are also discussed in their relation to damping-off. The most serious losses in conifers are usually from the root-rot type of damping-off. Of the different conifers, reports are available as to the susceptibility of 63 species. The best control method appears to be the disinfectant treatment of the seed-bed soil before or immediately after the seed is sown. For conifers sulphuric acid has been found very useful.—Frederick V. Rand.

2876. HAYES, H. K., and E. C. STAKMAN. Resistance of barley to *Helminthosporium sativum* P. K. B. Phytopathology 11: 495-411. 1921.—Previous studies of varietal resistance of barley (*Hordeum* sp.) to the spot blotch disease (caused by *Helminthosporium sativum*) show that Manchuria barley is fairly resistant and a high-yielding variety. However, its rough awns are objectionable and attempts are being made, by crossing this variety with Lyon, a smooth-awned and very susceptible variety, to produce a high-yielding and smooth-awned variety resistant to the disease. Several smooth-awned F<sub>3</sub> families from this cross have shown considerable resistance.—B. B. Higgins.

2877. HEINSEN, E. Das Auftreten und die Verbreitung des Tomatenkrebes bei Hamburg. [The appearance and distribution of tomato canker at Hamburg.] Zeitschr. Pflanzenkrankh. 31: 16-18. 1921.—The tomato canker, caused by *Didymella Lycopersici* Kleb. (*Ascochyta Lycopersici* Brun.) caused serious damage in the region of Hamburg where 50-70 per cent of the plants had succumbed or were dying. The fungus first appeared in 1919 about the setting time of the fruit. In well ventilated spots the damage was less severe. Cold wet weather was found to favor the fungus. Attempts to control the disease by removal of all diseased plants showed no favorable results. The author records having observed 5-50 dead plants surrounded by perfectly healthy ones though the reason the latter remained unattacked was not apparent. In April, 1920, the disease was observed in the seed beds. Infected plants showed blackening of the stem just above or just below the surface of the ground. The author suggests means by which control might be expected, and promises further information.—H. T. Güssow.

2878. HOLLRUNG. Das Lauwasserbad als Entbrandungsmittel. [The warm water bath as a means of destroying smut.] Fühling's Landw. Zeitg. 70: 96-110. 1921.—Several varieties

of wheat and barley were subjected to warm water treatments for loose smut. Each variety was subjected to 3 different treatments, namely: 24 hour's immersion in water at 30°C., 4 hours at 40°, and 1 hour at 45°. Germination tests were then made, including percentage germination, strength of germination, and length of sprouts at the end of 7 days in sand cultures. Different varieties behaved somewhat differently. In general the best results were secured by treating the seed for 1 hour at 45°C.—A. T. Wiancko.

2879. HORI, S. Outbreak of the blister blight of tea on Sizuoka tea plantation. Ann. Phytopath. Soc. Japan. 14: 69-70. 1921. [Text in Japanese.]—In the Sizuoka Prefecture the blister blight of tea caused by *Exobasidium vexans* Mass. has broken out yearly since 1919 and its damage seems to be very great. The author discusses his observations on the disease and states that control measures involve (1) the destruction of diseased plants by burning, and (2) spraying with Bordeaux mixture or lime-sulphur.—Takewo Hemmi.

2880. HORI, S. Pink-disease on the Unsu orange in the Miyazaki Prefecture. Ann. Phytopath. Soc. Japan 14: 67-69. 1921. [Text in Japanese.]—This brief report of the author's observation on the symptoms of the disease, which was found recently in the Miyazaki Prefecture, includes some discussion of the control measures. The disease, caused by *Corticium salmonicolor* B. & Br., is serious also in Formosa and the Philippine Islands.—Takewo Hemmi.

2881. HORI, S. Witches' broom of Paulownia in the vicinity of Tokyo. Ann. Phytopath. Soc. Japan 14: 70-71. 1921. [Text in Japanese.]—The witches' broom of *Paulownia tomentosa* (Thunb.) Steud. caused by *Gloeosporium Kawakamii* Miyabe is a well-known disease in the island of Kiushu in southern Japan. The author, who had never heard of the severe injury due to this disease in the vicinity of Tokyo, had his attention called in the spring of 1921 to an outbreak at Shimura near Tokyo, where the numerous young trees planted in 1919 were affected seriously. Briefly discussing his observations, the author points out the fact that the affected trees had heretofore scarcely shown the typical symptoms of "witches' broom" in the vicinity of Tokyo. The spray of copper emulsion was recommended as a control measure.—Takewo Hemmi.

2882. JONES, FRED REUEL. The leaf-spot diseases of alfalfa and red clover caused by the fungi *Pseudopeziza Medicaginis* and *Pseudopeziza Trifolii*, respectively. U. S. Dept. Agric. Bull. 759. 83 p., 3 pl., 5 fig. 1919.—Descriptions of the 2 diseases and discussion of their economic importance and host plants are followed by a detailed account of the taxonomy, morphology and cultural characters, physiology and pathogenicity, and studies of the life histories of the causal organisms.—One of the most important diseases of alfalfa is the leaf-spot caused by the fungus *Pseudopeziza Medicaginis* (Lib.) Sacc. A similar but less important leaf-spot of red clover is caused by the fungus *Pseudopeziza Trifolii* (Biv.-Bern.) Fekl. Both were obtained in pure culture and studied from various angles. Since cross inoculations from 1 host to another uniformly failed and both morphological and physiological differences were found, the author feels justified in retaining the fungi as distinct species. None of the imperfect fungi formerly regarded as a stage in the development of these fungi has been found to be related, and apparently only the ascospore form occurs in nature. The fungi live over winter on dead leaves which escape decay, and ascospores produced in spring furnish the source of new infection.—Frederick V. Rand.

2883. MAPPEI, LUIGI. Una malattia delle foglie del "Kaki" dovuta al *Colletotrichum kaki* n. sp. [A disease of the foliage of "Kaki" due to *Colletotrichum kaki* n. sp.] Riv. Patol. Veg. 11: 116-118. 1921.—*Colletotrichum kaki* is described as causing a leaf spot of *Diospyros kaki* L. var. *kiombo* cultivated in the botanical garden at Pavia. A disease caused by *Gloeosporium kaki* Seiya Ito was found on the fruits and the author proposes to determine whether the 2 diseases are caused by the same fungus.—F. M. Blodgett.

2884. MARTIN, J. F., G. F. GRAVATT, and G. B. POSEY. **Treatment of ornamental white pines infected with blister rust.** U. S. Dept. Agric. Circ. 177. 20 p., 12 fig. 1921.—This compilation on the causal fungus (*Cronartium ribicola* Fischer), symptoms, and control is written especially for those interested in ornamental white pines.—*L. R. Hester.*

2885. MATZ, J. **Investigations of root disease of sugar cane.** Jour. Dept. Agric. Porto Rico 4: 28-40. Fig. 1-6. 1920.—Isolation and inoculation experiments show that species of *Rhizoctonia* and *Pythium* are actively concerned in causing root rot of sugar cane. *Marasmius Sacchari* Wak., *Odontia saccharicola* Burt., and a species of *Trichoderma* gave negative results. A 2nd form of *Rhizoctonia* is described. These organisms are common in the soils of Porto Rico, but the environment as well as the condition of the seed piece greatly influence their parasitic severity.—*Geo. H. Dungan.*

2886. MÜLLER, H. C., E. MOLZ, und D. SCHRÖDER. **Weitere dreijährige Versuche zur Bekämpfung der durch Pleospora trichostoma (Helminthosporium gramineum) hervorgerufenen Streifenkrankheit der Gerste.** [Further three-year trials in the control of a stripe disease of barley caused by *Pleospora trichostoma* (*Helminthosporium gramineum*).] Fühling's Landw. Zeitg. 69: 321-331. 1920.—The disease appears on winter barley and is frequently observed first on the young leaves in late autumn as long, light colored stripes and later as brownish spots or stripes, which, however, may not be very noticeable until the following spring after the plants have headed. At this time the dark brown stripes are very marked and are accompanied by shredding of the leaves. The disease is especially noticeable at the beginning of grain formation, when affected plants begin to dry up and fall while healthy plants are still green. Many of the affected plants do not head out. Earlier trial of control measures were reported in Landw. Jahrb. [see Bot. Absts. 3, Entry 2710]. Results of seed treatment trials extending over 3 seasons, 1917-1920, are reported here. Materials used were formaldehyde (40 per cent), copper sulphate, upsulun, corbin, fusariol, sublumoform, preparation Ko. 6 of the Sacharin factory, Magdeburg, and preparation 777. The tabulated results show the effect upon germination, stand of plants, and percentage of diseased plants. In badly affected cases Ko. 6 was the only completely satisfactory remedy. In cases of moderate attack corbin and upsulun were reasonably satisfactory. Copper sulphate was also effective but injured the stand of plants. Formaldehyde, fusariol, and sublumoform were useless.—*A. T. Wiancko.*

2887. OPITZ, OBERSTEIN, und LEIPZIGER. **Kritische Betrachtungen zur Fusariumkrankheit des Wintersaatgetreides.** [Critical observations regarding the Fusarium disease of the seed of winter grains.] Landw. Versuchssta 97: 219-244. 1920.—In an effort to determine the effect of Fusarium infection of seed grains of winter wheat and winter rye, infected and disease-free seeds were germinated in the laboratory and in the field. No consistent differences were observed. Both showed about the same germination and early growth. Treatment of Fusarium-infected seed with sublumoform, fusariol, and upsulun showed no consistent beneficial effect. Observations on larger fields showed a favorable effect upon germination and early growth in some cases but during later development the untreated seed caught up with the treated and the results at harvest were about equal. Trials should be repeated to determine satisfactorily whether or not treatment of the seed is beneficial, as conditions were not such as to test thoroughly the effect of treatment upon survival through a severe winter.—*A. T. Wiancko.*

2888. PALM, B. T. **The false mildew of tobacco introduced into the United States from the Dutch East Indies.** Phytopathology 11: 430-432. 1921.—In regard to the suggestion of Smith and McKenney that *Peronospora Hyoscyami* de Bary may have been introduced into the U. S. A. on mats imported from Sumatra, it is stated that this fungus has never been found on tobacco in the Dutch East Indies. It therefore seems very doubtful that it could have been introduced in this way.—*B. B. Higgins.*

2889. PETHYBRIDGE, GEORGE H. Some recent work on the potato blight. Rept. Internat. Potato Conference. p. 112-126. Roy. Hort. Soc.: London, 1921 [1922].—The accounts of studies of *Phytophthora infestans* by various investigators are briefly reviewed from the admirable early paper of Rev. M. J. Berkeley published in 1846 down to some of the most recent work.—The author and his collaborators found that the oogonium at an early stage penetrates the antheridium at or near the base, grows up through it and emerges at the summit when it swells out rather rapidly forming a spherical portion in which develops an oosphere which becomes finally a thickened oospore. In pure culture on Quaker oat agar oospores often developed parthenogenetically in oogonia, apparently the change in nutrition acting as a stimulus. Thus far germination of oospores has not been seen, and these reproductive bodies have been obtained only in pure culture.—Control measures are reviewed and discussed, including spraying with copper sprays and the use of resistant varieties. Resistance to blight appears to diminish in the course of years. From the small amount of work done it seems probable that resistance is not of a mechanical nature but due to the presence of some substance in the cells which inhibits the development of the fungus.—*Frederick V. Rand.*

2890. PETTEY, F. W. The spraying of fruit trees. Jour. Dept. Agric. Union South Africa 3: 264-270. 1921.—This is a program for spraying pear and apple orchards in the coastal regions of the western province for the control of insect pests and *Fusicladium*. For complete control 10 sprayings with lime-sulphur are recommended.—*E. M. Doidge.*

2891. PEYRONEL, BENIAMINO. Il marciume amaro o marciume del cuore delle mele e delle pere. [A core rot of apple and pear.] Boll. Mens. R. Staz. Patol. Veg. Roma 2: 23-27. 1921.—Apples and pears in various parts of Italy are affected internally with a decay which begins about the core as a pale reddish discoloration and extends as a dry rot causing mummification. The causal fungus, *Tricothecium roseum* Lk. seems to gain entrance through the calyx end. The practice of placing the fruits with calyx end down seems to increase chances for infection, probably because of the increased humidity in the calyx cup.—*D. Reddick.*

2892. POOLE, R. FRANK. The Sclerotinia rot of celery. New Jersey Agric. Exp. Sta. Bull. 359. 27 p., 15 fig. 1922.—This is a semi-technical paper dealing with the damping-off disease of celery, due to *Sclerotinia libertiana*, in greenhouse soils in the muck farm areas where nearly total destruction was obvious in some houses about planting time in April. The life cycle of the fungus in greenhouses, and the sources of infection were worked out in detail. The relation of the disease on different hosts is also given. A satisfactory control was obtained by replacing infected soils with new soils on which lettuce had not been grown and also by sterilizing the infected soils with formaldehyde.—*Mel. T. Cook.*

2893. PRITCHARD, FRED J. Development of wilt resistant tomatoes. U. S. Dept. Agric. Bull. 1015. 18 p., 10 pl. 1922.—The characteristics and distribution of the disease, sources of soil infection, and persistence of the fungus in the soil are discussed. Use of wilt resistant varieties is the only successful means of controlling the disease. A high degree of soil infection was artificially maintained and resistant strains improved by further individual selections. After the 2nd selection no improvement was noticeable. The Marvel, Columbia, Norton, and Arlington varieties developed by the author, and Louisiana Red, Louisiana Pink, and Tennessee A 16-2 proved resistant to wilt and suitable for commercial purposes. Only a few commercial varieties showed resistance. Once established, wilt-resistance appears to be a fixed character. With 1 exception, the results of tests with wilt resistant varieties showed the same favorable results in all sections of the country.—*John A. Elliott.*

2894. PRITCHARD, F. J., AND W. S. PORTE. Effect of fertilizers and lime on control of tomato leaf spot (*Septoria Lycopersici*). Phytopathology 11: 433-445. Fig. 1-16. 1921.—The effect of different quantities and ratios of sodium nitrate, potassium sulphate, acid phosphate, air slaked lime, and copper sulphate on the infection of tomatoes by *Septoria Lycopersici* Speg. was studied. The tests were made in pots in the greenhouse. The fungus